CANADA MORTGAGE AND HOUSING CORPORATION

# THE FUTURE OF THE INTERNET AND THE HOUSING SECTOR

HOUSING AFFORDABILITY AND FINANCE

## Research Report

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# *The Future of the Internet and the Housing Sector*

*1999*

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# Summary

In the 1990s, the Internet has grown by leaps and bounds. Between 1996 and 1997, the number of Canadian households using the Internet doubled to 13 per cent of the total population. Over the same period, the number of new Canadian organizations on the World Wide Web—organizations whose domain name ends with .ca—have tripled to 34,047. Numerous areas of activity are showing interest in this new technology, particularly in its business applications.

The housing sector is also starting to show interest in the Internet. Results of a survey conducted by CMHC showed that technology has made significant inroads in this sector. More than 90 per cent of organizations have Internet access, and half of them have their own Web site. Moreover, the number of Web sites linked to the housing sector is increasing steadily.

Internet technology meets three major concerns.

Product research and development: the Internet provides quick access to relevant government information which can be used for business purposes.

The marketing of products and services: the Internet provides direct access to product catalogues, lists of properties on the Interagency Service, information on mortgage rates, to name a few.

The exchange and promotion of information: the Internet offers an opportunity to take part in discussion groups and makes it possible to disseminate information on government programs, regulations and so on.

At present, organizations primarily use the Internet for electronic mail and to distribute information over the Web. However, firms are increasingly seeking to exploit the potential of the medium, in terms of information distribution, user friendliness and interactivity, and are turning toward business applications. The Internet will not only be used simply as an information and communication tool but also as a transaction medium. Major changes will be made within organizations in conjunction with the introduction of new uses for clients.

The firms which were first to have a Web site achieved very favourable results. In particular, they enjoyed improved customer service and better visibility, and have been better able to communicate. Nonetheless, major disparities exist from one area of activity to another with respect to their ability to finance activities and skill levels. However, considering the

potential of Internet technology, the future holds much promise for all areas of activity in the housing sector—construction, real estate, financing, urban planning, etc. In this paper, these perspectives are presented in the form of scenarios for each area of activity and are intended to stimulate thought and bring about innovative ideas.

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# Introduction

The housing sector, like many other economic sectors, is just beginning to get interested in the Internet—and in how to adopt the publishing culture and the commercial potential. This study is intended to determine how far the Internet has penetrated the housing sector and to present opportunities the Internet will provide for the sector in the next few years.

Readers will find a brief presentation of the Internet, its history and method of operation in this paper. They will be able to consult data on the number of users in Canada and worldwide and to inquire about the uses of the Internet in the housing field. The persons interested in the most recent developments in technology will also find information on the new tools and new opportunities the Internet provides.

As for Internet penetration and its present use in the housing sector, readers will be able to examine the findings of a survey of organizations in the sector conducted by CMHC, which shows that the Internet has made very significant inroads. A selection of more than 70 Web sites in the housing sector appears in Appendix A. Finally, readers will find food for thought on the future of the Internet and the housing sector by noting the trends for the coming years in the following areas: construction, real estate, financing and evaluation, governments and government agencies, associations and urban planning.

The Internet is a collection of private and public computer networks around the world that have agreed to use a common protocol for transferring messages among themselves. Though owned by no one, the Internet is often referred to as a "network of networks." The common protocol, rather than being imposed by a single corporation or a government, has evolved from a process where standards compete for wider acceptance. This process stumbles along, diverging at times into differing, even incompatible ways of doing things, converging again on new agreed-upon norms.

"The Internet will have more public-domain standards than the computer industry has ever seen. At the same time, however, it will also make more kings."[1]

Two institutions are most easily identified as coordinating the current development of the Internet. First is the Internet Engineering Task Force, housed by the Internet Society, which is the keeper of the technical description of how packets of information are sent around and shared by computers. Second is the World Wide Web Consortium, at the Massachusetts Institute of Technology, which is the keeper of the technical description of file formats such as HTML, the HyperText Mark-up Language, which describes how information such as Web pages and multimedia objects are shared. These groups develop new standards, striking a balance between being too quick and misjudging the technical direction the Internet should follow, or being too slow and becoming irrelevant as de facto commercial proprietary standards emerge.

At a time when the role of government is in question in many jurisdictions in Canada and abroad, it is interesting to note that public dollars nourished the development of the infrastructure of the Internet from its inception. The heavyweight partnership of National Defense in the United States, the National Science Foundation and the academic research community across North America have fostered its growth since the '60s. The notion of the Web, with many alternate routes for information to pass from computer A to computer B, appealed to the military. If one information route was knocked out by the enemy, another route in the Web could be found. This same robust design was a godsend to the ad hoc, chaotic nature of the growth on the Internet in the civilian sector. There were no weak links. If a computer along the way was down or overloaded, another path in the Web would be followed until the electronic message reached its destination.

The infrastructure of the Internet consists of a common protocol used by a decentralized set of users. Long before "empowerment" and "team management" had become fashionable organizational theories in the private sector, they were being practised in the research community of universities. The Internet captured its market by stealth—no marketing departments or political campaigns—just a compelling concept with an irresistible price structure. From the user's point of view, it was free or next to free. From the institution's point of view, it was a way to distribute the cost of incredibly expensive computing research infrastructure over a large number of users, as well as a way to stretch the data capacity of existing telephone lines.

## Private communication

The original traffic on the Internet was file transfer and electronic mail. A store-and-forward system for electronic mail allowed institutions to take advantage of nighttime and bulk transfer to keep the carrier costs down. Researchers could share data for large computations over a distributed network. They could send notes and documents to each other, without resorting to paper printouts, travel to conferences, or mail and courier packages.

## Public bulletin boards and chat rooms

An early interesting development was the extension beyond the private communication among researchers. Bulletin boards, called news groups, became popular. Bulletin boards are based on two principles: first, any individual can post to this public forum and, second, a searchable archive of all messages to the news groups (ordered by topic or date) was maintained on host machines and in various "local" copies around the Internet.

Along with bulletin boards and group sessions, rules of etiquette were developed to encourage people to stay on topic, to take persistent personal debates to a private communication away from the news group, to encrypt off-colour material so that casual readers are not inadvertently offended and, most important, to maintain the free exchange of ideas by not promoting commercial products.

The political culture of the Internet was born. Self-regulation and a fierce attitude of non-censorship prevailed. New online communities developed, aligned by a common interest in a topic. Sometimes they appointed a moderator, where a trusted editor controlled the content of the discussions to permit quality to prevail over quantity of information.

Public interaction now often takes place in real time in "chat" rooms. People at their local computers send in comments and questions, somewhat analogous to a radio phone-in show, except that they type instead of talk, and they do not need to wait for their turn to speak. Cheap cameras now allow these sessions to be accompanied by photographs taken as you sit at your computer, so that you get more of a sense of being in a face-to-face meeting. As greater band width permits faster multimedia on the Internet, picture quality will improve and voice may be added.

## Public file storage and downloading

Bulletin boards were initially maintained by various site administrators on the Internet. This notion of providing archives on the network evolved into a form of publishing. File transfer protocols (FTP) allowed files to be shared; anonymous FTP allowed any random user to log on to the public area of another computer on the network to download files. Search tools such as gopher, Archie and WAIS (Wide Area Information Servers) allowed the users to find material using key words and navigational techniques.

## World Wide Web

The hybrid of private mail and public posting still lacked the "killer application"—an easy consistent interface for browsing through information. And this finally happened in 1990, when Tim Berners-Lee devised HTML at CERN, the European Laboratory for Particle Physics in Switzerland. The key element of his language was hypertext (a concept first described in the '60s by Ted Nelson) a simple way of linking one page to the next page, so that you could follow your way around the Web of the Internet by pointing and clicking on phrases that interested you. Key to its wide acceptance was the development of public-domain software, called Mosaic, by the National Center for Supercomputer Applications at the University of Illinois. This browser allowed you to read HTML-encoded documents and navigate though Web sites.

HTML is a very small set of codes used to create documents. There is more emphasis on the structure of the document (heading levels, tables to organization information, lists of information) than the actual look (fonts, colours, indentations).

The original HTML-coded document might look like this:

<H1>Lots of fruit</H1>
<H2>Apples</H2> <P>Apples taste good</P>

The published Web page may look, to people who have computer screens that can display different size fonts, like:

**Lots of fruit**

**Apples**

Apples taste good

To somebody whose computer will not display different size of fonts, the document may appear as:

Lots of fruit
Apples
Apples taste good

To somebody with poor eyesight, who has changed the default settings of the Internet browser to very large fonts, the document may appear as:

**Lots of fruit**

## Apples

Apples taste good

Because the appearance of the document was of secondary importance, it was possible to publish pages for a multitude of different platforms. Publisher and reader tolerated the variations in appearance of the document, to reach an unprecedented, wide audience working with a disparate array of old text terminals and the latest high-speed graphic work stations.

However, the interactive dream of the Internet has not yet been realized. The inventor of the World Wide Web never expected people actually to write in HTML.[2] Implementation details were supposed to be hidden from the user. Not just browsing, but also publishing on the Internet, was supposed to be easy. To annotate a Web page you read on the Net, or to publish your own page, is not yet, however, as easy as anticipated. As a consequence, Web site publishing, though no longer the terrain of the information technology experts, still is the initiative of the educated (often called "early adopters" of the technology). The Web site is composed of one-way communication, where the response from the reader back to the publisher is not so easily made.

Unstructured ad-hoc participation is still done through e-mail and, to some extent, by filling out online forms provided on some Web sites. The reader of a Web page does not necessarily know who read the Web page before him, nor what the previous reader thought. The onus is on the Web site publisher to include opportunities for interaction with the reader, as the underlying protocol does not in any way guarantee this.

The challenge coming over the next years will be to combine the community-building openness of e-mail and bulletin boards with the publishing strengths of the World Wide Web sites, so that two-way and multi-way "hyperlinks" flourish. Many industry observers believe that the public and private interests who master the art of community building will have the most success with the Internet.

### Advent of commerce

Initially, it was strictly forbidden to use the Internet for commerce. Public dollars and volunteer support hours everywhere were provided on the understanding that no one derived direct commercial benefit.

Even as commercial interests were invited in, the anticommercial bias of the Internet persisted. Jim Carroll, author of the *Canadian Internet Handbook*, as recently as 1995, found himself issuing an electronic apology to several news groups for having announced the commercial release of his latest book in news groups.[3]

#### New users

The Internet service providers have started selling access to the network. Since early 1995, the "last mile" problem—the dilemma of getting a computer network to extend to the desk of an

individual user—is evaporating. Instead of begging a local university to host you, you can buy time and access from a local supplier. And as the number of Internet sites grows, subscribers to commercial online services, such as CompuServe and America On-Line, have demanded and received access to the full Internet.

#### New content

Commercial sites are proliferating. Not so sure that there is money to be earned on the Internet, many companies for now are satisfied just to have a World Wide Web presence and achieve a high "hit count" (number of visits to the site). In some cases this "mind share," as opposed to "market share"—commanding the open minds of the consumers rather than their open wallets—can be converted to commercial advantage. The stock market success of initial public offerings of Netscape and Yahoo, was largely based on the name recognition these companies had on the Net. The next decade will show whether this optimism of the stock market is warranted, and whether these companies can convert mind share into market share.

#### New markets

But the hopes for the Internet are greater. More than a new library or a new publishing medium, it is believed that the Net will create a new way of doing business. As it changes the efficiencies of business transactions and the relative cost of input shifts, we will see fundamentally different products directed at fundamentally new markets.

### Commercial winners

So who will win big on the Internet? Hardware manufacturers should do well. These are the companies that make the computers and components that provide access to the Internet and that power the servers, and the companies which make the hardware that routes the Internet traffic. Both the economics and the technology are on their side. Larger numbers of users mean economy of scale; engineering advances spell dropping costs and the opportunity to make and sell even more devices.

Carriers also stand to be big winners: the phone companies and cable utilities which own the communications lines and the rights of way to send the bits of information about the world. Though telephone people did not intentionally nurture the growth of the Internet, they are now scrambling to do so—to adapt and simplify their protocols to carry more traffic at lower cost, and to get into the business of services to the end user (hitherto the realm of the commercial online services and the Internet service providers.)

There is a certain inexorable quality to the development of its infrastructure. Driven by the fundamental economics, and the flexibility of the technology, these players will do well. "The [commercial] promise [of the Internet] lies in the ability of companies to form well-defined communities that will protect their property and promote their own interests."[4]

But, on the content side of the Internet, all bets are off as to who will prevail. Some business analysts observe that to succeed at using the Internet, companies need to tame its anarchic character and create communities among individuals, not unlike the original research communities of the Internet, so that rules of business conduct can prevail.[5] In some cases, the company uses the Internet to enhance or transform an existing product or to improve customer service. An oft-quoted example is Federal Express' Web site which allows customers to access the company's package-tracking system over the Internet. The commercial winners here will be those that identify what aspect of their business is most readily aligned with the decentralized, yet integrated character of the Internet.

"It's hard to imagine a world in which reporting, writing, visual design, and editing skills won't continue to be needed. The question is who will employ journalists? And to do exactly what?"[6] In other business circumstances, it is the actual content on the Web site that is the product. Will the traditional big media companies prevail—the CNNs, the New York Times, and the Warner Brothers? Will content providers from the

computer consumer industry, such as Microsoft and Nintendo take over? Or will a crop of new faces flourish? Microsoft is today building up the content side of its operation—hiring more women with multidisciplinary backgrounds, rather than just young graduates of computer science programs. Its efforts to date are concentrated on the CD-ROM and multimedia applications, but the company is positioning itself for the Internet, as well, by launching electronic magazines.

Traditional media are also experimenting. The associate editor at Newsweek's interactive, online experiment, postulates that journalists will be "producing stories that are seen less as edicts and more as conversations."[7] It is likely that the commercial winners among content providers will be those which learn to lead these conversations.

## Democracy on the Internet

"No formal agreement is necessary, no quorums, no vote need be taken, for substantive change to occur."[8]

In some ways, it is much easier to anticipate the Internet's potential for empowerment and giving voices to citizens, than it is to spot business opportunities. This is because the culture of the Internet is in many ways very consistent with democratic principles. Because there is no natural monopoly on providing content, the Internet enables existing ideas of participation and citizenship to flourish. Furthermore, it allows the government to communicate its policies without relying on mass media outlets. However, the Internet can only serve the function of community empowerment insofar as access to the Internet is widely available and diversity of content not only theoretically, but in reality, exists.

### Access

A policy brief of the Information Technology Association of Canada[9] reflects a prevalent optimism about the Internet. It advocates a limited role for government, promoting a spirit of open standards and deregulation, and the education of users who will access the information highway. The brief promotes the idea that the marketplace will sort out the access issues, presumably to remote areas and the less wealthy families in Canadian society. Some of these issues are discussed in the next section, Technical bottlenecks.

Canada's Information Highway Advisory Council, and the advisory body to the Canadian government, addresses the issue of access to the Information Highway and recommends the government should stipulate equal tariffs for people in remote communities or with special needs, and should actively support community networks and Freenets.

Freenets, which are non-profit, community-based networks, have addressed the issue of access squarely for a decade. Much of their development was prompted by lack of access. Before there were commercial Internet-access providers and user-friendly browser software, far-sighted individuals wanted to share the power of the Internet beyond the research community. The National Capital Freenet was Canada's first, initially fostered by Carleton University.

### Content

"We cannot assume that either the technology or the culture of the Internet—both of which are changing rapidly—can 'protect it' from government regulation or commercialization, whatever form it may take."[10]

Some sceptics[11] have a more cautionary message. They point to historical examples of initial high hopes for radio and TV as means of democratization. Instead, it can be argued that mass media has, on the contrary, restricted diversity and promoted uniformity of views. The president and CEO of the Public Broadcasting Service in the United States warns that "Revolutions, to be worth the wrenching change and dislocation that they bring, should have high and worthy purposes."[12] He urges that there be concerted action on behalf of the public to ensure that the information highway fulfills its promises.

An overwhelming portion of traffic on the Internet is attributable to a small number of sites, suggesting that even where spectrum is not a scarce resource (as it is for TV or radio) people seeks out the most popular brand names.

Freenets face this issue directly. They provide a local public place in cyberspace where the average citizen feels welcome to share information—not unlike the role often played by community newspapers, or by the ideal of the town hall where every resident can get up and put in their two cents' worth. Government can sometimes spawn networks that share the grassroots characteristics of a Freenet—an example in Canada would be SchoolNet, hosted by Industry Canada in partnership with the private sector, which essentially is created by and for schools, teachers and students.

One way of empowering citizens is to give better access to the work and information of their governments. Canada's open government program has put an ever-increasing number of departments online. Citizens and advocacy groups wanting to know about the latest government announcements can check the full text online, rather than relying on summaries or interpretations in the media. Online publishing allows documents of only short-term interest or of interest to only a small segment of society to be distributed at low cost.

At the same time, the availability of the Internet can lessen government's influence, by providing extra-national groups (such as the United Nations) direct access to citizens, or by giving revolutionary groups (such as the Zapatistas in Mexico or dissidents in Myanmar) an external audience they would otherwise have difficulty reaching.

#### Language

The Internet was designed as a highly redundant and fault-tolerant mesh. However, its actual structure today, on a global scale, is much more like a U.S.-centred star.[13]

The predominant language of the Internet is English. But the "without borders" character of the Internet means the standards groups are working on technical protocols to allow for different character sets and languages (called Unicode, and sponsored by the Internet Engineering Task Force). Companies are turning their attention to supporting tools. Tools we will see include browsers (software for surfing the Net) that allow the user to choose the language, search engines where a search on the term "information highway" would also yield sites that contain the term "inforoute" and Web sites that present themselves in the language of choice instead of being manually selected by the reader.

On the content side, Canada (particularly government and national associations) has some fine examples of bilingual Web sites, building on a strong print tradition of offering material in both English and French. The Internet Society is becoming more and more international in character. (The most recent conference held in Montréal provided complete simultaneous translation in English and French.) But unilingual Web sites in other languages are not common. Recognizing the need for intervention, the government of Québec is developing programs to promote the use of French on the Internet.

### Technical bottlenecks

Unlike the failed efforts at display phones and video terminals of the '70s and the early '80s, and interactive TV in the late '80s, there is a fair consensus that today's technical bottlenecks on the Internet will be solved. The sheer size of the already-installed base of Internet users, discussed elsewhere in this paper, pretty much guarantees the market conditions to induce the problems to be solved.

#### Will the traffic jams ever let up?

Band width is increasing, but not as fast as the number of users and the number of multimedia applications. All are carefully designing their sites to go easy on the size of files, particularly graphic files, as Internet users are not going to wait

patiently for one full minute to download a page to read. Several techniques are being explored, and some are already in use to combat this problem. Multi-casting allows a single copy of a popular page to be sent to a node computer, before being duplicated and distributed to the end-user computers (useful for broadcasting a Rolling Stones concert or a live chess match).

Another technique, called "caching," is used to maintain copies of popular sites in other locations. While it may appear to the users that they have downloaded a Web page from Mountainview, California, they instead have downloaded an hour-old version of the page being "cached" (or held temporarily) by their Internet service provider. This significantly reduces overall traffic on the Net. Protocols are being developed, so that time-sensitive information (such as stock-market quotes) cannot be cached.

Not everybody in Canada will pay $2,000 for a computer in the household. It is widely believed that the market of personal computer users will soon be saturated. Luckily, the most popular aspect of the World Wide Web remains predominantly text-based. Used, slow computers, equipped with a modem, can do the job for those who want to, or have no choice but to, keep their equipment purchases to under $500.

But it is likely that in North America the next group of Internet users will be found among those who want to enhance their TVs. The $500 Internet appliance will plug in to the ubiquitous TV screen and appeal to those who don't want to learn word-processing and spreadsheets. All they want to do is mail and surf the multimedia World Wide Web. Many companies are working on such a product, commonly called the network computer or the Internet terminal.

That is not to say that the popularity of the personal computer is necessarily threatened. The launch of the $600 Pippin™ by Apple in Japan is not meeting the anticipated commercial success. The growing computer-educated segment of the population will still wants the full-featured personal computer to download and manipulate material with spreadsheets, word processors or graphics programs. And the narrow band width of the Internet means many will still prefer disk-based personal computers for some time.[14]

Phone lines, let alone Internet connections, are not necessarily found outside the developed world. Low earth-orbit satellites[15] will be delivering Internet in real-time, or "real-enough time" to remote areas where the cost of laying down fibre is prohibitive.

## In the work place

Much as the arrival of commercial players is changing the Internet, so is the Internet changing the way companies are organized.

"What you're really trying to do is harness the collective brainpower of the Net in the service of your product."[16]

Many industry watchers see a blurring of functions among traditional departments inside a company. The marketing function becomes part of the job description of the product engineer; the product cycle is shortened by releasing ideas and products still in the testing stage onto the Internet for comment. The links between producer and consumer are stronger than ever. The wide use of the Internet is driving down the cost of hardware and software that support the Internet protocols. These cost savings are being applied to internal corporate networks—these private networks using Internet protocols have been dubbed "Intranets." The Intranet will affect different companies in different ways.

But there are compelling reasons to think that knowledge-based industries will adopt Internet for internal communications as readily as they adopted word-processing packages in the last decade. For these sorts of companies, instead of having information distributed in a top-down fashion, it comes from all directions in the company. As John Gage of Sun suggests, the real way to spot power inside a company will be to track e-mail flow and see who is in the know in what hot projects.

Some companies, on the other hand, perceive the Intranet as a threat—a time-waster akin to chatting at the water-cooler. Or, worse, as a security risk—providing information in an electronic form that can easily fall into a competitor's hand. These may use it in a more limited fashion, as a "broadcast model to communicate corporate policies and product or market news to worldwide divisions."[17] This new style of information flow within companies increases the options for flexible work, such as telework from the home. Some perceive this as a liberating event; others foreshadow peril. The dissenting minority report of the Information Highway Advisory Council, written by Jean-Claude Parrot of the Canadian Labour Congress, sees this another opportunity for unregulated exploitation of workers' hours, and for the displacement of unskilled workers who are loath, or unable, to adapt to the new technologies.

As we investigate how the housing sector is using the Internet, where do we expect to find activity? Functions of the Internet that are most likely to be in use include: "The government is awash in content. It is necessary to find ways to get that content out so that it can be used by the private sector to exploit business opportunities and generate new employment."[18]

### Research and product development

- Accessing official sources for building codes and proposed revisions.
- Informal exchange of "not-yet-published" experiences and case studies among professionals.
- Accessing demographic, financial statistics and mapping from government bodies such as Statistics Canada, Canada Mortgage and Housing Corporation, Environment Canada.
- Conducting online market research on housing needs and preferences among new homebuyers.
- Online access to privately maintained databases, such as appraisal information or electronic bidding services.
- Online access to academic journals.
- Online slide libraries of housing examples.
- "The information highway directly affects a frequently-referred-to cause of market inefficiency—imperfect information."[19]

### Marketing of goods and services

- Providing customers and potential customers with information on the mortgage rates and fact sheets on how to obtain a mortgage.
- Accepting mortgage applications online.
- Providing floor plans and neighbourhood sketches for new housing developments.
- Providing an online database of resale homes, such as the Multiple Listing Service.
- Providing online access to product catalogs, such as the Canadian Wood Council's gallery of housing projects.
- Providing information on new home warranty programs, such as the Ontario New Homes Warranty Program.
- Providing information on Canadian products for export markets.
- Providing descriptions of neighbourhood amenities and facilities.
- Gallery or online portfolios of architectural achievements.

### Information sharing and advocacy

- Information on government housing programs.
- Information on landlord – tenant regulations.
- Discussion groups raising awareness on specific issues.
- Online access to official community plans and community consultation exercises.
- Information on associations and advocacy groups—constitution, policy documents.
- Distance learning opportunities with universities and colleges.

### News groups

News groups are like bulletin boards. You log on to get the information you require or use one of the many search engines to seek out information by key words.

### List servers

List servers host e-mail addresses to which interested parties subscribe. Some are private to qualified or paid-up members (such as the Council for Planning Librarians, or the lists maintained by the Intergovernmental Committee for Urban and Regional Research). Many of these are public, where all may participate, or employ a moderator to ensure that the contributors stay on topic. Most are dominated by American participation.

## Characteristics of popular Web sites

As you visit these World Wide Web sites, consider the attributes of the successful ones—sites where people return again and again.

### Sheer size

Information-hungry users will visit big sites. Yahoo, the Internet directory, is the number one site in the world. A good example of this in the housing world is the U.S. Department of Housing and Urban Development site. This site has a tremendous amount of housing-related information. Using its search engine that makes navigation easy, Web users are likely to come back and look for additional information.

### Plenty of external links

Internet users develop a sixth sense for self-promotional sites that don't take you anywhere else. They are looking for launching pads into the universe of the Internet. The University of Buffalo's Planning and Architecture Internet Resource Center presents the world. The Canadian Home Builders' Association has external links to Canadian and U.S. official associations.

### Official source material

Frustrated with brief snippets from media reports of key documents or government studies or uncertain of exactly what statistics they do want or need, users are hungry for access to original source data—and some government bodies are providing that.

### Clear presentation of material

Some sites are an island of orderliness in the midst of the unvetted chaos of the Internet. Fancy graphics are not really as important as a convincing, well-structured presentation of the information. A good example in the private sector is found in real estate marketing, where the Multiple Listing Service provides online access to properties across the country.

### Interactivity

People expect the Internet to involve them. Those sites that invite user comment, and synthesize and evolve on the basis of user input, will cultivate a loyal following.

To use the Internet effectively, companies and organizations in the housing sector must pinpoint where their interests correspond to the dynamics of the Internet. As the Internet moves away from its static text-based roots, new tools and protocols will affect the growth of its content. How useful will they be to the research, publishing, business, marketing and advocacy functions of the housing sector?

## Graphics, sound and video

To experienced couch potatoes, filmgoers and video-game aficionados, the Internet is actually pretty disappointing. Its textual emphasis has made the Internet a hit, since it is accessible to pretty much any computer on any modem. But graphic designers are frustrated by the World Wide Web. Designers want to control completely how their document looks; they want to provide an interactive environment for games and encyclopedias; they want the user to control the flow of the story; they want sound and music. Real estate companies want a full marketing impact with their Web sites—combining the high production values of a TV commercial or glitzy brochure with the interactivity of the World Wide Web. Mortgage companies desire fully interactive sessions that can replace a personal meeting between financial officer and client.

There is no doubt among industry observers that there will be an explosion of multimedia in the next decade on the Internet. It is not nearly as clear what standards this multimedia development will adopt. In the meantime, various private companies and consortia are rushing to adapt their existing software and create new data types for the Internet. They require two things: to compress their files to minimize the download time and to provide a way of reading the information. The first is primarily a technical problem, the second also has much to do with marketing.

No single viewer or browser can read or "play" the complete variety of file formats or data types. Instead third-party developers create smaller software that "plugs in" to Netscape, the world's most popular browser software. About 15 plug-ins are available for various platforms and can be downloaded, free of charge, from the Internet. Some of these appear in print, with fonts, columns and all (Adobe Acrobat), or let you listen to audio performances in a streamed format as you sit in front of the Web page (Progressive Networks RealAudio), or allow you to watch and listen to brief animations (Macromedia ShockWave).

The ensuing confusion of which plug-in to download may turn into the Sony–Beta format competition of the '80s. Not only do end-users have to take the time to download the plug-in on their own computer, any server hosting a Web site must also have a licence to serve up that format (which is one of the places that the plug-in developers make their money).

To deal with the standards issue, industry has tried to agree on a common language for writing Internet applications. The most likely contender is Java, an object-oriented interpretive computing language that Sun and partner companies are pushing as the norm. Java is cross-platform and runs on most popular computing systems. It is designed to allow a computer program to be resident on the Internet itself, so that you can cobble together an application based on tiny programs called "applets" developed on distributed software. Java uses the computing power of your local machine to run programs stored anywhere on the Net (although nothing prevents a Java program being run by the host computer instead, with simple output sent to the user). The applications allow interactivity and animation, essentially a way of controlling the local computer to do the bidding of the Web site being visited. By mimicking the decentralized character and open standard of the Internet itself, it is hoped that Java is a strong enough standard to persist.

## Three-dimensional visualization

To design, build and market houses, three-dimensional graphics software holds great promise as a way of simulating and testing the design before getting into the expense of actually building it. Three-dimensional CAD has been under development over the last 15 years. What does the advent of the Internet bring to this issue? It will be significant in two ways. The Internet increases the pressure for standardization of formats, so that people anywhere using any hardware and software can view and manipulate the pictures that have been created. Second, the collaborative culture of the Internet will affect the design process itself, allowing people to create modular pieces of designs and either intentionally, as part of a work team, or less intentionally, borrow ideas and shapes to create something new.

The emerging standard published by the Web consortium is called VRML (Virtual Reality Modeling Language). The last version, Moving Worlds VRML 2.0, renamed VRML in December 1997, added a new functionality to the representation of the world in three dimensions. The new standards make the static geometry of linear models more real and allow for interaction between objects and animation. They also make it possible to define objects which can be shared between programs. The more developed the standard, the more it will enhance interaction between developers. The standard defines, to a certain extent, the machine code information language for the display of three-dimensional models, which simplifies the work of firms developing navigators.

"It's like video: Everyone can make a video, but it takes someone with a collection of special talents to do it well."[20]

The tools to create virtual reality models will be affordable and run on the newest graphical computers. But development of VRML models will become the domain of technicians, not of clerical staff. The really useful models will be created in design labs by individuals who understand the subject matter well.

## GIS and the integration of data

Architects and builders are not just interested in how the house will look in three dimensions. They also want to be sure that it uses readily available supplies, and to determine cost; they want to be sure that the design complies with the relevant building and fire codes. Planners and buyers want to know how it fits into the neighbourhood, what nearby values are like, and what community services and job prospects are available in the vicinity. This involves overlaying demographic, legislative, economic data on the spatial data. Geographical information systems (GIS) to perform this task are growing in use in cities and regions across the country. The Internet is a tremendous motivation to continue the data integration process, and ultimately will provide a cheap and universal method for the end user to access these expensive systems. It also presents a method for maintaining data in distributed locations with distributed processing. The challenge is to develop new systems without losing the effort in assembling the data in earlier, legacy formats. As an example, in New Brunswick a pilot project is under way to make land registry data available over the Internet.

But the path to global integration is paved with huge proprietary issues among the private and public players, and peppered with privacy concerns from the individuals about whom data is being collected. Successful projects will depend on partnerships and collaboration.

## Electronic data interchange

During the same period when the Internet was breaking down barriers within the research community, commercial institutions were also working on the integration of data to facilitate transactions for suppliers and customers. Electronic data change (EDC) allows the transfer of purchase orders, invoices and, sometimes, payment directly between different companies. Since the mid-80s, the Electronic Data Interchange Council of Canada has been facilitating this work in Canada in various sectors.

## Cybercash

The housing sector is a market. Builders, realtors, financial institutions, even building suppliers, will likely be doing business on the Internet. Once security issues concerning use of credit card numbers on the Net (which encryption techniques are quickly satisfying) are resolved, the Internet could be described as simply a bigger and better online version of mail-order catalogs and automatic banking machines.

But there is a move afoot to go beyond credit-card transactions to transactions that bear a closer resemblance to cash—where the parties to the transaction are anonymous and where the overhead cost of a transaction is very small.

Estimates are that the average credit-card transaction is $70, and that overhead cost of a credit-card transaction is 75 cents. The developers of standards are pushing for a model where transaction amounts could be cost-effective for a transaction-value cost as little as a tenth of a cent. If this happens, the Internet can start to sell things previously perceived as having no value at all. The most obvious example would be access to a single article of a magazine. Currently, you would be hard-pressed to persuade a newspaper reader to pay $1.00 for an online version of the newspaper that he or she would prefer to leaf through in the local coffee shop, but the same reader might be perfectly prepared to download a favourite columnist for a quarter of a penny.

## Intelligent agents and Internet directories

Early adopters of the Internet were a patient lot: creating content on the fly, using word of mouth—spread by e-mail and news groups—and keyword searches on distributed indices such as gopher sites, Archie and Veronica, and WAIS (wide area information services) to spot new information. Search engines, with much wider coverage and more user-friendly search forms, carry on the task. These powerful computers send out software that crawls about the ever-changing Web, indexing each and every word of every document that is linked by another document.

The huge growth in the number of Web sites means more sophisticated search tools are becoming necessary—searches that ultimately weigh the quality and relevance of material. The most sophisticated tool among them will be the human brain. Librarians are acquiring a new status as the creators of annotated bibliographies in specific areas. More and more journalists and editors footnote their work with pointers to the information Web. Real estate brokers will take their clients on virtual searches before they have to climb in the car. And mortgage brokers will be able to conduct searches for money in the international market. Creators of Web sites help in the cataloguing by embedding hidden HTML tags in which they self-identify key words and brief abstracts of the documents on their own Web sites, which are then picked up by search engines.

New search software, called "intelligent agents," mimic the human brain by using trial and error to "learn" how to do searches. The software, over time, develops a profile of the user's interests and matches documents found on the Internet with a ranking provided by the user. This concept can be extended to an adaptation of polling, where large numbers of like-minded individuals are continuously polled on their favourite sites, creating a ranking of relevant interesting sites for certain personality types or interest groups. These intelligent agents will also become savvy shoppers, searching for the best price for value anywhere in the world.

New ways of searching for material which is not text-based, such as graphics, sound and video, will have to be developed.

## Collaborative software and the Intranet

HTML and the World Wide Web are transforming publishing by offering a simple, consistent, point-and-click user interface. A similar transformation is going on in the world of person-to person communications. The hodgepodge forms of communication, including private mail, e-mail

list servers, chat groups and video conferencing have already been discussed. A confusing array of options is available, each with its own advantages and disadvantages—and none yet really beats a face-to-face meeting.

Meanwhile, document projects are bigger and more collaborative, creating the need for a streamlined way to control versions of documents and incorporate changes. Somewhat independent of the Internet, groupware solutions have been developed—the most famous of which is Lotus Notes (now owned by IBM).

New forms of cooperation are expected to emerge due to the open standards, the low cost of Internet and techniques which make it possible to manage the developing complexity in the world from groupwares of private firm networks. A harbinger of this phenomenon is that the private sector will develop these standards—the new Netscape navigator named Communicator 4 (professional version) integrates cooperative functions.

Collaborative software is so central to coordinating how people work together that, over time, common standards and interfaces will likely emerge to revolutionize the work place in the '90s and the next century, much as word-processors did in the '80s. It will have components of video, real-time interaction, version control of documents and archives of key materials.

## Publishing and HTML editors

Internet is putting publishing in the hands of office workers. This is not a story of technical innovation; rather, it is a story of economics. The simple power of the current specification of the Internet already delivers a powerful publishing medium. The essentials to clear documentation—easy-to-use table of contents, the integration of visual information such as pictures and charts—already exist. Word processors will "edit" Web pages as easily as print pages, and manage Web sites as easily as large documents. Soon, any office worker's curriculum vitae will include HTML editing alongside word-processing in the set of standard skills.

## Research and teaching

Just as collaborative software will change how people work together, new learning paradigms are transforming the teaching and research world. No longer do students need to be in the same location as their teachers, colleagues or libraries. Tools that mirror the teaching environment by creating electronic syllabi, course materials, marking and evaluation records and tutorial sessions—have been created over the last decade to allow teachers and students to use video, phone and mail to invent "distance learning." The Intranet drives these tools to be cheaper, more widely available and, ultimately, will mean that students and teachers alike will be as comfortable with a computer and Internet connection as they are today with a lecture theatre and white board.

# The Internet: an overview and statistics on users

If we put aside for a moment the technical aspects and progress anticipated with respect to the evolution of Internet technology in the next few years, what can be said for the current situation? In the 1990s, the Internet has experienced breakneck growth. The number of host sites, Web pages and users has increased steadily.

## Overview

*How many users are there?*
*Income is the passport to the electronic highway.*
*How many users are there in Canada?*

According to Statistics Canada, more than one in three Canadian households (36 per cent) owned a personal computer in 1997, three times the figure recorded 10 years ago. Moreover, 21 per cent have a modem, which means that about two households in 10 can access the Internet.

The number of Canadian households with Internet access is increasing steadily. Tremendous growth occurred in 1997, as the proportion of households with Internet access rose from seven per cent in 1996 to 13 per cent a year later. Approximately 1.5 million households had access to the Internet from home in 1997. The figures do not include Internet use from the work place or from public places (libraries, universities, etc.). British Columbia, Ontario and Alberta have the greatest number of Internet users.

Statistics on computer knowledge indicated that the younger the person, the more chance he or she has of being able to use a computer. In 1994, 81 per cent of young people aged 15 to 24 could use a computer as opposed to 36 per cent of adults between the ages of 55 and 64. Moreover, the higher the income, the greater the likelihood of owning a computer. In 1997, more than six in 10 households with an annual income greater than $72,514 had a personal computer. Conversely, only two in 10 households with incomes less than $18,653 had a computer, a rate four times lower than the preceding figure noted.

*How many computers are there worldwide?*

The oft-quoted Nielsen study conducted in October 1995 revealed that 17 per cent of North American adults (37 million) had access to the Internet and that people on average surfed the Internet 5.5 hours each week. Sixty-six per cent of users were men, and 64 per cent of the women had a college degree (as opposed to 29 per cent of the total population). These findings far exceed Matrix News forecasts in July 1995, that is 22,590,000 users with 6,020,000 computers in 112 countries.

The FIND/SVP study in November and December 1995 confirmed the rapid growth in the number of Internet users and revealed that 51 per cent of these users started using the Internet for the first time in 1995. This study also stated that the Internet was primarily used for communications and second to search for information. It also found that people spend 6.6 hours per week surfing the Internet rather than watching television or making phone calls.

Table 1:
Proportion (per cent) of households with Internet access, 1997

| BC | AB | SK | MB | ON | QC | NB | NS | PEI | NWT | YK+ NWT | CANADA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | 15 | 9 | 11 | 15 | 9 | 7 | 10 | 8 | 10 | – | 13 |

Source: Statistics Canada.

A recent survey by the Graphic, Visualization and Usability (GVU) Center which was conducted in October and November 1997, showed a very sharp increase in the number of women using the Internet. Women represented 40 per cent of Internet users in the United States in 1997, up from five per cent in 1994. This study also indicated that 84 per cent of users, for whom the World Wide Web constitutes an important source of information, feel that this technology is indispensable.

*How many host sites are there?*

The number of host sites, or the number of domain names, is a good indicator of the percentage of firms with an Internet site. Statistics compiled by Network Wizards indicate that the number of host sites worldwide rose from 213 in 1981 to 535,000 in 1991 and then to 29,670,000 in January 1998. Note that this figure almost doubled between January 1997 and January 1998.

The Canadian Domain Name Registry (managed by the CA Domain Committee and the University of British Columbia) coordinated the assignment of domain names finishing with .ca. It only gives one name to each organization. On August 4, 1996, 9,566 organizations were registered, and on July 17, 1998, this figure had reached 34,047. More than 11,000 new organizations were surveyed in 1997 alone. Of the Canadian organizations, 77 per cent were in the business category, 15 per cent in other, five per cent in education or teaching and three per cent in government. The following is the provincial breakdown (note that only federal agencies do not require any provincial or territorial code).

Note that numerous Canadian organizations can be registered under several business names with the American InterNic (that is, their domain suffix can be .com or .org).

Table 2:
Number of organizations with .ca domain, by province (July 17, 1998)

| | |
|---|---|
| BC | 4,119 |
| AB | 1,873 |
| SK | 414 |
| MB | 1,557 |
| ON | 7,697 |
| QC | 5,792 |
| NB | 378 |
| NS | 752 |
| PEI | 147 |
| NFLD | 353 |
| NWT | 65 |
| YK | 79 |
| CA | 10,841 |
| TOTAL | 34,047 |

Source: CA Domain (http://www.cdnet.ca/info/statistics).

*How many pages are on the Web?*

A study by a Canadian firm presented at the last Web conference revealed that more than 50 per cent of Web pages contain graphics, a page contains 1,050 words on average and almost 80 per cent of pages do not contain any URL address to refer the reader to other sites (sites which do not lead anywhere). Finally, 87 per cent of pages on the Internet are created in HTML language. It is estimated that there are about 50 million Web pages worldwide.

# The Internet and the housing sector: survey of the current situation

In 1997, CMHC sent out survey questionnaires to organizations in the housing sector to measure the extent of Internet penetration, gain some idea of main uses and identify how associations, organizations and government agencies will benefit from Internet in the next few years.

The relatively high response rate (40 per cent) and the many respondents from organizations of all sizes, all categories of affiliation and all areas of activity within the housing sector provide good representation. (See Appendix B for details on the sample of respondents and the survey methodology.)

## To what extent has the Internet penetrated the housing sector?

Organizations in the housing sector have adopted the Internet for the most part. Eighty-six per cent of organizations have Internet access and slightly more than half (55 per cent) of organizations with Internet access also have a Web site. Note that, in all cases, Internet access includes electronic mail and Web access. In most cases, when an organization has an Internet connection, all employees have access as well. Access is limited to less than half of the personnel in only two of 10 organizations.

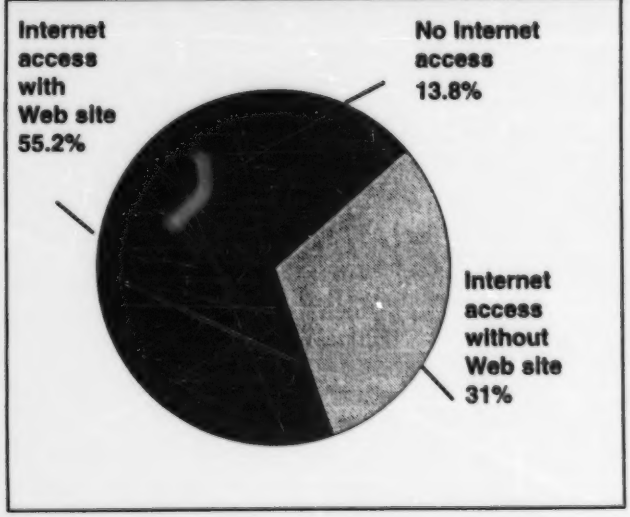
Internet access is generalized, regardless of the association's affiliation, that is in the private and the public (provincial, federal, municipal) sectors. Organizations promoting their activities outside Canada are more than likely to have adopted the Internet. All have Internet access and three-quarters also have a Web site.

### Internet access is recent

Regardless of their area of activity, most organizations have had access to the Internet for only one or two years. Many have connected to the Internet since the questionnaire was distributed; 14 per cent of organizations had acquired an Internet connection in the last six months. Most organizations have had a Web site for at least one year (only one organization has had its site for three years).

### Internet access to become more widespread in coming years

Figure 1:
Organizations in the housing sector and the Internet (data expressed as a percentage)




Judging by the data gathered in 1997, it is very likely that the number of organizations with Internet access has increased since that time. Moreover, 60 per cent of organizations which were not hooked up anticipated that they would be doing so sometime in 1998. It is therefore expected that the number of organizations with Internet access will have reached 93 per cent by late 1998.

In the same vein, most organizations surveyed anticipated that they would be developing a Web site, most within a year. One-third were undecided about investing in a Web site, and only one reported that it would never be developing one. The number of Web sites should thus increase more than 12 per cent and the number of

organizations with a Web site should reach 67 per cent in late 1998.

## The major uses of the Internet

### Electronic mail

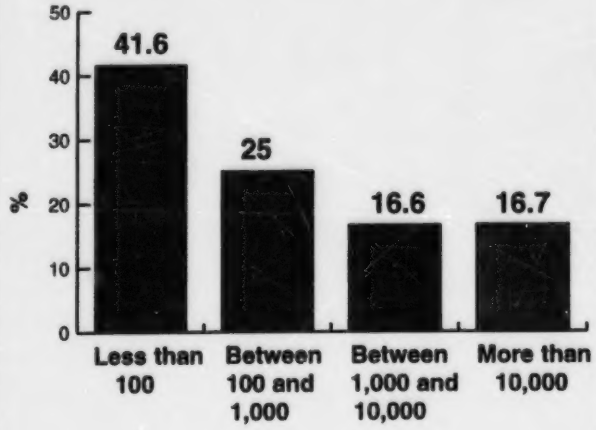
The use of e-mail within organizations (between colleagues) and outside (with colleagues on the outside) is the most common and widespread activity. People in organizations which also have a Web site use e-mail more frequently to contact persons outside than those who only have Internet access.

Four organizations in 10 (not a negligible figure) participate in discussion groups or subscribe to electronic billboards, which are more involved uses of the Internet.

The most frequently consulted Web sites are those which contain government or international data. Sites with market studies are visited by slightly more than half the organizations. Organizations dealing with urban or community planning or those specializing in social housing navigate the most through these three types of sites.

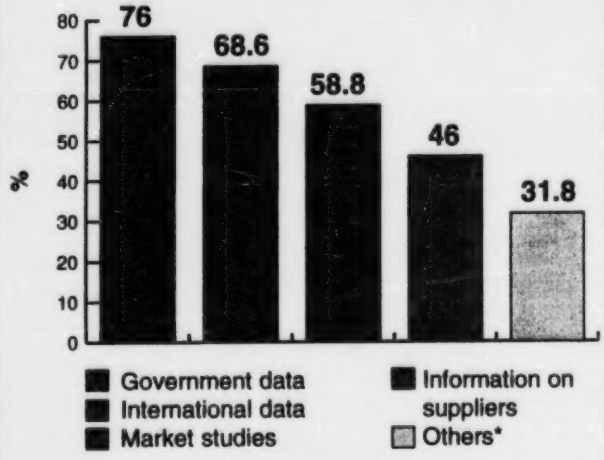
In another vein, organizations in the construction, manufacturing and finance sectors most often consult sites with information on suppliers.

Figure 3:
The number of hits on Web sites*




* Only 12 organizations gave us information.

Figure 2:
Web sites most often consulted by organizations in the housing sector




* More often than not, these include the organization's site or sites related to the organization's area of activity.

### Managing the Web site in the organization

Only half the organizations monitor the number of hits on their site. In cases where these figures are calculated, the data are most often used to determine the popularity of certain pages and to improve the site. In certain cases, these figures are also used to justify the costs involved.

The wide variations are explained by the diverse profiles of organizations which responded. The number of members can vary from a few hundred to more than 25,000. In general, organizations whose

sites have the most hits are governments, government agencies or professional associations with a large number of members.

**Updating a Web site**

Most organizations devote less than 10 hours a month to updating the Web site. In only 11 per cent of cases, is a full-time position (approximately 120 hours a month) devoted to this task. It must be pointed out that updating requirements vary greatly depending on the type of site, that is whether they have a news entry, whether they offer home page accommodation services for members or whether they are limited to disseminating information sporadically.

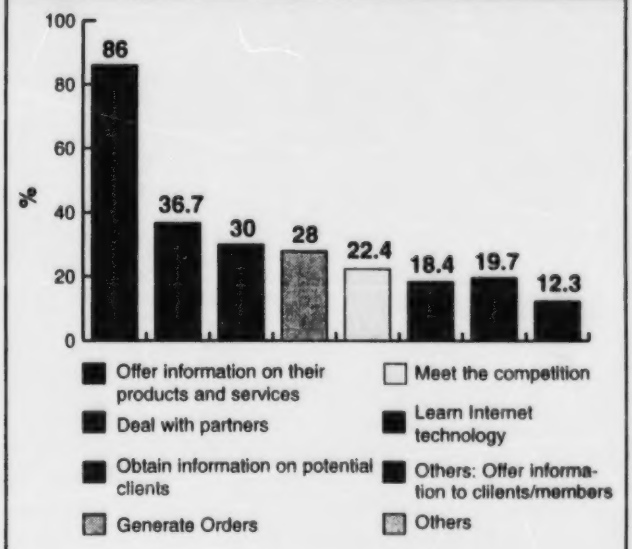
Most organizations call on outside consultants to do updates, but often, the work is done jointly by someone inside the organization (secretaries basically) and a consultant. Only five per cent of organizations have a computer services department which handles this function.

## What motivates organizations to develop a Web site?

The basic reason why organizations have acquired a Web site (or foresee doing so) relates to their need to offer information on their products and services, particularly to their members or clients, regardless of the area of activity. The usefulness of the Web site in dealing with partners and the prospect of generating orders for products and services constitute the other two most important reasons.

Urban or community planning organizations essentially expect to gather information on members or potential clients. Firms in the construction and real estate sales fields recognize the Web site as a useful way of positioning themselves with regards to the competition.

Figure 4:
What motivates organizations to develop a Web site




Also noteworthy is the fact that 80 per cent of organizations have never tried to determine, either formally or informally, how Internet was used by their members or clients. Organizations in the real estate field seem to be more interested in this matter than others.

## What obstacles are perceived in using the Internet?

In general, lack of equipment is considered the most important obstacle to using the Internet. The construction field, in particular, is lacking in this respect, in contrast to organizations specializing in assessments and financing. The second most important problem is a shortage of skills, which relates essentially to a lack of training, or even the possibility of getting training.

Some government agencies deplore bureaucratic delays, which are often the cause of the slow implementation of technology, and the absence of institutional policies aimed at encouraging the use of new technology.

Non-profit organizations and a sizeable number of other firms attribute their situation to a lack of funds, as they feel they cannot invest in equipment and personnel training. Organizations specializing in the real estate sales field are quite concerned by security problems associated with electronic transactions.

Other major obstacles include the costs of investing in computer equipment, the lack of expertise to maintain infrastructures, the doubt over potential benefits the new technology can produce, too few members with Internet access or even their indifference to, or lack of knowledge of, the Internet.

## What factors are favourable to using the Internet?

The technical aspects of Internet technology, particularly the speed and the user-friendliness of the medium, are recognized by organizations as very favourable factors. It must be pointed out that the need for up-to-date information is a major concern to more than 75 per cent of organizations (all areas of activity combined) and that information dissemination concerns almost all associations in the sector.

The low cost of the Internet, when compared with the telephone, messenger service or subscriptions to printed magazines, is also a determining factor for half the organizations, especially governments and government agencies which often communicate with their members.

Organizations specializing in real estate sales recognize that the increased visibility over the Web site constitutes a very important factor. Those specialized in social housing and the construction field realize the potential of the Internet in distributing information and services to members, even though at the present time, and especially in the construction sector, members with Internet access are few and far between.

Finally, the sharing of information (particularly for intergovernmental administrations) and the possibility of accessing information on members directly over the Internet are other interesting factors.

## What are the expectations and needs of organizations with respect to the Internet?

Organizations formulated several such expectations from the standpoint of technology, content and accessibility.

### Faster and more certain transactions

Improving access from the standpoint of transmission speed represents a priority for many organizations which complain about how long it takes to download Web pages. Moreover, the possibility of disseminating information and doing secure financial transactions was mentioned quite often. Progress in the area of transmission speed (increased pass band) and security (development of cryptography) is eagerly awaited.

### More relevant content for the sector

Some organizations expressed a need for a greater number of Web sites relating to the housing field. This specifically included more specialized information in specific fields such as information on evaluations, the registration of mortgages, etc.

### Greater accessibility to content

In addition to the cost associated with accessing the network, which a few associations mentioned, problems accessing the contents were mentioned most often. The development of simple and effective search tools are among the most pressing requests. Another view expressed was expanding the number of possible uses, such as providing access to government documents in such a way that they can be printed directly, turning to electronic subscription systems to save time, and gaining access to reliable and user-friendly teleconferencing systems.

## What are the views of organizations with their own Web sites?

In general, very favourable comments were expressed, even though most sites are far too recent for conclusions to be drawn. The advantages of having a Web site include:

- improved customer service (for those with Internet access);
- increased visibility of the firm;
- broader communication base (for example, persons can be contacted internationally for promotional purposes);
- comments regarding online publications can be obtained with a view to improving the content; and
- considerable increase in the number of library loans.

Organizations whose expectations have not been met are few and far between. Moreover, even those expectations which were only slightly realistic were exceeded. Conversely, several said they were surprised at how long it takes to maintain a Web site and, particularly, to update it. Organizations whose employees have little access to Internet have noted little traffic at their site, which makes it difficult to assess the impact. Technical problems such as slow transmission, difficulties logging on or with format incompatibilities, particularly when exchanging documents, were reported.

## What are the trends for Internet access and use for the coming years?

Five major factors must be taken into consideration: the computer equipment of organizations, their communication and cooperation requirements, the extent of their publishing and research activity, employee training and the rate at which employees or clients access the Internet.

### Computer equipment

At the present time and according to the results of the survey, all organizations in the housing sector are using computers, but they are not all that well equipped. Peripherals such as CD-ROM readers, speakers or digital cameras are uncommon and often reserved for particular colleagues in organizations. However, eight organizations in 10 have monitors with graphic functions and modems.

Internal networks (LANs or WANs) are used in most organizations (61.5 per cent) and can be accessed by most employees. Only 12 per cent of organizations have an Intranet—mainly governments and government agencies. However, this figure is expected to triple in the next few years, since 24 per cent of the organizations are planning to install an Intranet.

### Methods of communication

Organizations basically communicate with the outside (members, clients, suppliers, etc.) by phone, fax and regular mail. In the future, the development of e-mail could considerably reduce the costs associated with these options. Teleconferencing could also produce savings in travel expenses entailed by meetings in other locales.

Table 3:
Methods of communication and cooperation used by organizations (per cent)

| | General | To communicate with employees, clients, suppliers, etc. |
|---|---|---|
| Telephone | 86.2 | 100 |
| Electronic mail | 65.5 | 55.2 |
| Regular mail | – | 87.7 |
| Fax | 81 | 91.4 |
| Teleconferencing | 62.1 | 41.4 |
| Local meetings | 82.8 | 60.3 |
| Meetings involving travel | 74.1 | 50 |

In organizations, the use of e-mail and the installation of Intranets, which make it possible to disseminate and exchange information in reliable fashion, should yield rather substantial savings of money and time. Governments and government agencies pounced on this opportunity.

**Publishing**

Almost all organizations (97 per cent) publish documents, an essential activity for almost six in 10 organizations. Distribution is free in most cases (cost is often built into quotes). If not, the set price is normally high enough to recover the production costs.

Documents published most often are magazines or information bulletins, request forms and reports (annual or quarterly). Organizations for which publishing is essential will use the Internet as a means of distribution as soon as a sufficient number of their employees have Internet access. Members will thus be able to print their request forms or obtain their news bulletins and other information generally disseminated by their organization.

**Research and development**

Six organizations in 10 are involved with the research and development of products or services.

Table 4:
Documents published by organizations (per cent)

| | Never | Sometimes | Often |
|---|---|---|---|
| Press releases | 10.6 | 53.2 | 36.2 |
| Product information | 16.2 | 62.2 | 21.6 |
| Annual or quarterly reports | 6.4 | 46.8 | 46.8 |
| Statistics | 14.6 | 53.7 | 31.7 |
| Research documents | 13.3 | 60.0 | 26.7 |
| Request forms | 4.8 | 42.9 | 52.4 |
| Advertising | 14.6 | 51.2 | 34.1 |
| Magazines or bulletins | 21.2 | 17.3 | 61.5 |

Table 5:
Sources of information used for R&D (per cent)

| | Never | Sometimes | Often |
|---|---|---|---|
| Press releases | 10.6 | 53.2 | 36.2 |
| Statistics | 2.8 | 36.1 | 61.1 |
| Reports | – | 28.1 | 71.9 |
| Recent publications | – | 34.4 | 65.6 |
| Original historical publications | 4.0 | 72.0 | 24.0 |
| Client of sector surveys | 5.7 | 62.9 | 31.4 |
| Directories and summaries of periodicals | 11.1 | 44.4 | 44.4 |

Sources most frequently used by organizations for their studies are reports (or documents on directives), recent publications and statistical data. Though used less frequently, client (or sector) surveys and original historical publications constitute other major sources.

Most of the studies done in organizations involve the integration of statistical data or are based on the consensus of various organizations and individuals, particularly in organizations specializing in urban or community planning. The possibility of accessing sources of information in the former case and the quality of the methods of communication in the latter case are key factors in preparing these studies.

The Internet can adequately serve organizations in their research activities by providing them with access to an immense information bank. As library catalogues are now online, access to documents has already been improved. Similarly, access to online statistical data (for example, the Statistics Canada Web site) shortens the time it takes to obtain printed material.

Moreover, electronic subscriptions, which enable users to receive regularly via e-mail lists of recently issued material, should also make it possible to simplify and optimize the research task.

## Discovering new uses

Employees of organizations as well as members (or clients) will need to get training on new practices relating to the use of Internet technology. Employee training, and especially the supply of innovative products and services for members, will be instrumental in the development of new uses.

### Skills development

At present, aside from the word-processing and accounting applications, the most common activities by organizations in the housing sector are desktop publishing, statistics production and database utilization. Geographical information systems (GIS) for surveyors, for example, or modelling applications for architects, are seldom used.

In most organizations surveyed, employees receive little information on how to use computers. About half receive less than five days of training per year, and in two of 10 organizations, employees are self-taught.

With regards to the use of the Internet, two-thirds of the organizations surveyed are already offering training to their employees or intend to do so in the near future. However, of the organizations involved in Internet technology, in other words, those with a Web site in addition to an Internet access, four of 10 do not plan on doing so.

Huge disparities exist then, depending on the area of activity and categories of affiliations. In particular, public sector organizations are twice as likely to offer Internet training sessions as others. Moreover, they devote, on average, between five and 10 days annually to computer training in general. The situation is far different in other organizations in the housing sector which, usually, are much smaller and have fewer resources at their disposal. Contrary to other software applications, the popular belief is that Internet use can be learned easily and that the best way to do so is through discovery. Although it is true that surfing the Internet does not require a great deal of training, such cannot be said for doing effective research on the Web.

In conclusion, the quality of equipment is currently being upgraded in most organizations, a trend which should continue in the years to come. Nonetheless, major disparities exist between organizations within the housing sector, which is very fragmented and includes many small firms receiving very little in comparison with government organizations, for example.

In larger organizations, the internal willingness and decisions with respect to introducing new technologies and training will be instrumental in the development of new uses. Resistance to change cannot be overcome without efforts to inform and train staff. Decision makers therefore have an important role to play in this regard.

As for small businesses, associations will also have a key role to play, because it is through them that members will learn about the technology and its potential. Small business will have to come up with uses that are sufficiently innovative and relevant, that is, those which really do provide value added, for members to move toward Internet technology.

Internet technology is changing too rapidly to make any definitive findings with respect to the use of this technology. However, in light of the few years of experience with Internet technology and the constant technical progress being made, it is possible to formulate proposed scenarios for each area of activity in the housing sector.

# What does the future hold? The challenges of Internet use in tomorrow's housing sector

What are the various avenues organizations in the housing sector will be able to follow in future to take advantage of the Internet's potential?

Proposed scenarios are presented for each of the areas of activity in the housing sector. These suggestions are based on the survey findings in the preceding part and the ideas and reflections of the players in the housing sector at group sessions organized by CMHC across the country. (Results of the group sessions appear in Appendix C.)

## The construction market

The construction field consists of a huge number of small firms which make little use of computer equipment. However, Internet technology can offer very attractive opportunities to builders.

### Source of information

It is in the interest of builders to take advantage of the Internet as a new information tool. As much important information on the profession is already available on the Web on topics such as procedures, best practices standards, materials, new products, etc., construction firms would be up on the latest news more quickly. Quick access to (statistical) databases will also help them target their customers more effectively. Builders can already find information on the guarantee programs for new houses on the Canadian Home Builders Association Web site or on most of the sites of provincial associations (see Appendix A).

### Channel of distribution

Builders associations already perceive the Internet as a channel of information distribution to members, and this should increase in the coming years. The Internet costs relatively little as opposed to the distribution of printed material, which is very important. However, a few builders still have no Internet connection, and as long as the actual benefits are not more visible, investment in computer equipment will be slow.

Associations will probably play a very important role with their members by encouraging them to adopt technology through the establishment of interesting services (rapid dissemination of information, accommodation of Web advertising pages, etc.). Moreover, the use of the Internet as an information medium destined for the general public will enable associations to educate and protect consumers.

### Discovery of new markets

Another area of interest for builders, and small firms in particular, is that the Internet will enable them to advertise at low cost and give them an opportunity to find new markets. This new visibility on the Web will enable them to promote Canadian know-how internationally and, in due course, to sell concepts or ideas beyond our borders. For example, the expertise of Canadian professionals in the lumber industry can open the door to markets in northern or eastern European countries, for example.

### Online product catalogue for clients

Having housing-product catalogues online (valves and fittings, doors and windows, floors, etc.) represents an interesting future opportunity for companies specializing in the field. Clients appreciate being able to shop for products directly on the Web, which takes a lot less time than the in-store shopping alternative. The use of intelligent agents will make it possible to integrate intelligent functions on the Web sites and to suggest products to clients based on what they have already actually queried. For example, it will be possible to suggest models of switches or electrical outlets when the client is shopping for flooring or paint.

### Virtual reality

In the field of design, progress in virtual reality will be of more interest to architects and engineers. Modelling applications allow a virtual

visit to a building before it is built or plans in three dimensions, thereby accelerating and improving the quality of design processes. However, to date, the software development industry has taken little interest in this field, and few applications are available on the market.

Professionals in the field are confronted by slow transmission speeds and extremely unwieldy files. Ironing out these problems will necessarily require efforts to create smaller software in conjunction with more powerful systems. Increasing the width of the band pass will also help solve the problem of slow data transmission over networks.

#### "Hooked-Up" Homes

The penetration of the Internet into houses coupled with the future development of a centralized system to control room temperature, electronic and household equipment and so on, will pose new problems for builders regarding the design and installation of electrical and telephone circuits. Once mobile telephones were supposed to eradicate this problem, but the arrival of the Internet and, to a greater extent, network technology in housing, could raise this matter once again. It is highly likely that builders will be subject to new pressures, particularly with respect to their qualifications in the field.

## The real estate market

The real estate market, whether the rental market, homeownership or financing, has much to gain from Internet technology. This sector has shown keen interest in the Internet right from the outset, and the number of Web sites in this field has increased steadily.

#### Window display

The Internet first appeared to real estate professionals as a good way of advertising, as was the case in many other fields. Numerous Web sites sprang up—many not overly sophisticated or complete. A good many sites focus simply on advertising, but innovative sites are increasingly being developed. This trend is a precursor to very important developments in this field.

#### Complete service

By offering additional services on their Web sites and taking advantage of the Web's graphic capability, real estate professionals will exploit the potential of the Internet to its fullest. Clients wanting to purchase property will appreciate receiving detail on the various services available in the sectors they have chosen (nearby schools, bus lines), in addition to information on the price, surface area and so on. At the click of a mouse, users will be able to get all this.

Visually, clients will be able to see photos taken from different angles, or even three-dimensional images, to form a better opinion of the house or the apartment they are looking at. The ability to zoom in on a map, for example, will enable clients to have a better idea of the neighbourhood and the location of the property.

One sign that the Internet real estate market interests other sectors was seen when Microsoft recently developed the Home Adviser, a Web site offering huge amounts of very detailed information on neighbourhoods, schools, safety and so on, in cities where clients want to purchase property. They can select a neighbourhood based on such criteria as the number of residents, average income, the level of education and the crime rate, and then obtain a list of homes with the usual information (number of rooms, surface area, parking).

Moreover, real estate sales or rental professionals will also be able to learn more about their clients through surveys. To the extent that the users' navigation within the site (through the use of intelligent agents) can be followed, it will be possible to detect where their interests lie. These techniques, which can be used with or without the user's knowledge, can be employed to draw up accurate profiles of potential clients and adjust the offer accordingly. In future, following the example of the experimental site developed by Microsoft, more and more intelligent sites will

make it possible to anticipate clients' needs and to offer them personalized offers based on their previous choices.

#### New partnerships

New partnerships will likely result from the offer of additional services on the Web sites of real estate professionals. They will have every interest in offering clients the most complete service possible, for example, the possibility of assessing property or securing the services of notaries or lawyers. These partnerships will involve actors in the private sector (evaluation firms, financial institutions) and the public sector (municipalities, schools, libraries and the like). The advertising benefits derived by these associated professionals will also be taken into consideration. In the final analysis, the Web sites will truly offer value added to clients. In other words, those who do not limit themselves to merely posting advertisements (in an advertising window) will stand out.

### Financing and evaluation

Telecommunication technologies, including the Internet, are very interesting and hold much promise for financing and assessment companies which, in general, use a great deal of computer equipment.

#### Automated teller machines

The use of internal networks (Intranet) in institutions and Internet for client services will yield considerable savings in operating costs. At present, most financial institutions are offering their services over the Internet, and within a few years, it is more than likely that services traditionally offered over the counter will be at a minimum. Automated teller machines (ATMs), which came out a few years ago, have already started to automate services.

The Citizens Bank of Canada and Mbanx (a division of the Bank of Montreal) are interesting examples in that they are precursors to the "bank of the future." They are entirely virtual banks, that is, they do not have physical premises where they receive clients. All services are remote and provided by the Internet, e-mail, the telephone, fax and ATMs.

Shifting the demand for counter service to ATMs will mean that new methods of operation and new practices will have to be implemented for the institutions and their clients. If clients have all information at their disposal, it will be easier for them to compare interest rates, for example, and move their accounts from one institution to another very quickly and relatively easily. Customer loyalty will become a huge challenge for financial institutions which will have to strive to develop new and sufficiently innovative products to retain clients (for example, integrated products combining banking and insurance services).

From this perspective, clients will have to bear the cost of computer equipment and Internet hook-ups. However, they should benefit by getting better rates in return. The real question is the attitude clients will have with respect to this new service and how they are disposed to change. To what extent are they willing to change their habits and do distance transactions over a computer? These new ways of doing things are taking hold in certain segments of the population (active and young people, and those with a certain level of education and income). They may not all change their habits quite so easily. Furthermore, financial institutions will be faced with the problem of cutting staff.

#### Online financial information

Clients are becoming increasingly interested in obtaining information online. Thanks to the Internet, it will be possible to track mortgage rates more readily. Clients will appreciate the ability to access information on the selling prices of the homes on the street they are interested in buying. Appraisers will be able to access data on appraisals done by their competitors to adjust their estimates. Clients will also appreciate the graphic capability of the Web when they have access to banks of housing model photos taken

from all angles, rather than having to settle for an approximation on a photocopy.

## Governments and government agencies

At a time when strong pressure is being exerted on public budgets, new technologies will produce major savings in government agencies with the use of private networks (Intranet) and Internet to communicate with, and distribute to, the public. Moreover, the speed with which departments have adopted the Internet is testimony to the expectations governments have formulated, which are basically tied to cost reduction.

### Public service

Governments have seized the opportunity afforded by Internet to disseminate information at low cost and thus to fulfill their role as educator by making available huge quantities of information which previously has been difficult to access. Both federally and provincially, the Internet makes it possible to inform citizens of the various action programs pursued by different departments and particularly, to distribute press releases quickly.

At the present time, government Web sites are basically limited to disseminating information. However, simply making information accessible on the Web prevents jamming the telephone lines, which improves service to the public. For example, preliminary consultation of information on the Revenue Canada site can make up for long waits for service over the telephone.

In future, it will be in the interest of governments to offer complete packages of information, rather than just presenting partial information. For example, it would be useful for citizens to find out from one single address tax amounts, bus lines, emergency services, schools, etc. Even though citizens will have to bear the costs, they will derive an immediate benefit, particularly in time savings.

### Inside government agencies

Networks will help improve the effectiveness of transmissions and the sharing of information between government and intergovernmental agencies, due to the centralization of information and the availability of databases on protected networks (Intranet or Extranet). Seen from this perspective, a mere Web site can become a true reservoir of information shared among several administrations. In addition, virtual conferences could be organized, thus avoiding travel to attend meetings outside the organization.

The channels of information distribution within government organizations are in the process of changing. With the new tools which will facilitate schedule management, exchanges of documents, access to databases and so on, new information infrastructures will be created.

## Associations

When it comes to adopting new technology, most non-profit associations are confronted by two major problems: lack of funds required for equipment and lack of competent human resources. These associations, however, generally do publish numerous documents and distribute information to their members on a regular basis. By using Internet technology, they will be able to reduce their operating costs significantly while improving the quality of service to members.

### Public participation

The dissemination of information on the Web and by e-mail will enable associations to save on postage and faxing charges and also encourage public participation. To the extent that these organizations are called upon to respond quickly to current events or to departmental releases, the speed with which the news gets to members and, in return, the ease with which reactions can be obtained (by way of online surveys), their effectiveness will be increased significantly.

This new method of distributing information and communication should result in better communication with those outside the organization, while at the same time favouring the exchanges of information within the community of members. These perspectives are attributable to two factors: first, the members' willingness to adopt the Internet and second the number of members hooked up to the Internet.

## Urban planning

### Teleworking

With the development of communication technologies, teleworking is now possible, at least technically speaking. Theories have been advanced about the possible social transformations due to the advent of this new form of work organization, particularly a possible drop in urban density because of the outflow of people from the city core to more outlying regions. In reality, teleworking is not very widespread, as only a minority, essentially in the services sector, use it.

The Internet considerably broadens the range of places where people who can work out of their homes are able to settle. The network makes transportation, which is essential when one chooses a place to live, a non-issue. Though the trend is not yet apparent, urban sprawl could well become a reality in the years to come. There could be an exodus from major centres to smaller centres, which would not necessarily be that far away.

Organizations do not always offer the conditions which could accommodate this new form of work. Teleworking is suited to specific types of employment where physical contact is less important or can be replaced with distance communication and where tasks are sufficiently repetitive or well known by employees so that they can work autonomously. Jobs in computers, publishing, translation and the like, are examples.

## Outstanding issues

The future development of Internet use in the housing sector depends on several elements, which are linked to the uncertainty over the evolution of Internet technology per se, or to the current context firms are currently working in. Though constant technical progress is being made, numerous legal, socioeconomic or political issues pertaining to the development of the Internet still have not been answered.

### Copyright problems

In general, the copyright issue must be resolved for the Internet to fulfill its role as a true bank of information. The publication of texts and photos on the Internet poses new questions regarding the protection of documents on electronic supports. Aside from the legal and legislative debates, it is highly likely that these matters will be dealt with in agreements and partnerships between private partners.

### Updating information

Updating information on the Internet constitutes a huge challenge. The reliability of a site is largely based on the fact that the information it contains is relevant, that is, checked and up to date. Moreover, regular updates guarantee greater loyalty on the part of users and boost the organization's credibility.

In the housing sector, not all sites have the same requirements. For example, it is obvious that information on mortgage rates must be updated daily, whereas general information on the missions of an association or a department can be updated less frequently.

In very competitive sectors such as mortgage insurance, firms must be able to work within tight timeframes, as their clients could otherwise get the service from another institution. With the use of the Internet, timeframes may become tighter and the transmission of information may even become faster. The instantaneousness of the technology (sending an e-mail with the click

of a mouse) is such that clients expect to obtain replies just as quickly. Under these circumstances, staff could well be subjected to even greater pressure.

The information on the Internet becomes dated very quickly because of the speed with which it can be distributed over this new medium. This will involve the deployment of resources to monitor the information in organizations. Documentation specialists, librarians and other information managers have a very important role to play in this area.

**Cost-effectiveness and electronic advertising**

The cost-effectiveness of investment in Internet technology is one of the major question marks for decision makers. If offering new services on the Internet results only in reducing the costs associated with the old way of doing things, the prospects of additional gains will be quickly limited.

Organizations in the housing sector (as is the case in other sectors) will have to study the actual needs of their clients or members and their willingness to finance new services on the Internet, particularly via telepayment.

Electronic advertising is one of the most promising avenues. Advertising bands are more and more widespread on Web sites, including those in the housing sector. Numerous sites offer online information for sale, which is becoming increasingly popular, and more variations are emerging, such as the direct selling of information on Web pages accessible on request for a fee.

**The creation of alliances and partnerships around new products**

To meet the needs of their clients better and to retain these clients, firms entering new electronic markets will have to develop new products, which will involve the formation of new partnerships. These alliances can be in the form of a consortium bringing together participants from various areas of activity or groups of firms in the same field to promote their common interests in the sector.

The emerging trend is complete customer service, in other words, the most complete service possible. Many firms will have to restructure their products or the ways they provide services to reach this target. Moreover, increasing export opportunities require that market studies be conducted which take foreign competition into account, even markets previously considered local.

**Flexibility of human resources**

The establishment of new information and communication technologies in organizations has disrupted the conventional information transmission and dissemination networks. Work places which favour individual initiative and offer training opportunities to personnel appear to be more inclined to adopt technology. More often than not, it has been reported that the push to use the Internet comes more from the employees than from management.

**Flexibility of products tailored to client needs**

Investment in new technology involves costs and a share of risks. One of the challenges facing organizations concerns the definition of products tailored to client needs. Organizations currently engaged in research or expanding their markets will be interested in the opportunities offered by the Internet. Those who are beginning to develop new products will also be able to take advantage of this medium to tailor their products to it.

The question still is the extent to which clients or members will adopt the Internet. Among the general public, the number of people hooked up to the Internet has been progressing constantly, but it may be limited to certain categories of people. In the building and real estate sectors, many employees who have to move around constantly do not have any need for a computer for the time being, let alone to be connected to the Internet. Professional associations will have to develop sufficiently innovative

and relevant uses to encourage members to adopt technology.

**What will be the government's role?**

The various actors in the housing sector often say they need a reliable and credible stakeholder with respect to information or directives concerning technological innovation. Some believe that the government, among others through the CMHC, could assume a leadership role both as a provider of information and as a model of business connected to the Internet for other organizations.

## Conclusion

Various sectors of activity have only just become interested in the Internet, which is a recent phenomenon. The technology itself is progressing continuously, and uses are still emerging, which makes it difficult to attempt to establish long-term forecasts.

With respect to the housing sector, two main findings emerged from this study. Internet penetration into the sector is well under way, and the first evaluations of the technology have generally been quite positive, although some uncertainty exists regarding the nature of the changes made. The sector is still in its infancy as far as using the Internet is concerned, but the lightning-fast evolution of the technology and its uses do predict some very interesting future developments in all areas of activity in the housing sector.

This document is intended to provide interested organizations with a source of information and food for thought on the future of the Internet and the housing sector. It is to be hoped that the readers will find answers to their questions, particularly clarifications of the technology and the status of its present and future development and, especially, useful ideas to make better use of the potential of the new Internet technology.

# Endnotes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# *Appendix A*

# *The housing sector in Canada—a few sites*

Note that preparing a complete list of Web sites in the housing sector is impossible, because it would be too long and changes every week. The Web sites indicated were selected due to their interest to the sector and their comprehensiveness.

## Institutional and government sites

In general, government Web sites contain huge amounts of information. As novices in this area, governments have published, with only some success, historical information which was not necessarily available in electronic format. Some sites provide a list of titles rather than original documents, especially when cost recovery or revenue earning objectives resulted in sales of documents.

*Canada Mortgage and Housing Corporation /*
*Société canadienne d'hypothèques et de logement* French/English
http://www.cmhc-schl.gc.ca/

This huge site describes the various activities of the CMHC and provides much information on purchasing and financing housing. Recent news on the housing market and the latest national releases are presented. A list of publications and projects under way is also available, and a search engine makes it possible to research all the pages on the site. Note that a list of news groups concerning the housing sector appears on the site.

*Canadian Housing Markets Online /*
*Service en direct—Marchés du logement canadiens* French/English
http:/www.chmos-sd-mloc.ceds.com/

The Canada Mortgage and Housing Corporation, in cooperation with the Conference Board of Canada, offers the CHMO—Canadian Housing Markets Online. It is an on-demand service providing detailed and accurate information on the housing market (payment required).

*Industry Canada—Forest Industries and Building Products /*
*Industrie Canada—Industries forestierès et matériaux de construction* French/English
http://strategis.ic.gc.ca/sc_indps/sectors/engdoc/fore_hpg.html

With a presentation of statistics, recent news and a profile of the sector, the site is very well designed and the interface most pleasant. Moreover, the site has a personalized search engine to allow you to do quick searches.

*Canadian Commission on Building and Fire Codes—National Research Council Canada (NRC)/*
*Commission canadienne des codes du bâtiment et de prévention des incendies—Conseil national de recherches du Canada (CNRC)* French /English
http://www.irc.nrc.ca/ccbfc/

This site presents a comprehensive collection of Commission model codes and allows access to a database on statements of intent pertaining to national codes while offering the opportunity to make comments. Public discussion lists on the codes are also indicated.

*Intergovernmental Committee on Urban and Regional Research (ICURR) /*
*Comité intergouvernemental de recherches urbaines et régionales (CIRUR)* French/English
http://www.icurr.org/icurr/

This site provides a good overview of the Canadian scene with respect to research on local administrations and refers users to official and unofficial sites. Personalized bibliographies are presented in a very useful "librarian" style. Moreover, the site provides access to the ICURR database and includes explanations on exhaustive studies. There is exclusive assistance to its members, and users can order publications and borrow books online.

*La Société d'habitation du Québec (SHQ)* French/English
http://www.shq.gouv.qc.ca/index.htm

This site presents SHQ activities and programs. Recent news, information on the housing situation in Québec and internationally, and a list of research publications and documentary resources are also available on the site.

*Régie du logement du Québec* French/English
http://www.rdl.gouv.qc.ca

This site presents the Régie's mandate, laws and regulations, and information on the rights and obligations of landlords and tenants.

*New Brunswick Municipalities, Culture and Housing /*
*Ministère des Municipalités, de la Culture et de l'Habitation—Nouveau-Brunswick* French/English
http://www.gov.nb.ca/mch/indexf.htm

This site, which comes complete with a search engine, presents the department's activities, news and communiqués.

*Vancouver City Plan* English
http//www.city.vancouver.bc.ca/commsvcs/planning/cityplan/intro.html

This site, which consists only of text, is a good model of a complete presentation of an official source document on a program known as a city plan in which citizens take part.

*Ontario Ministry of Municipal Affairs and Housing /*
*Ministère des affaires municipales et du logement* French/English
http://nrserv.mmah.gov.on.ca

The temperate interface of this site is pleasant. It contains a description of the department and its activities (including social housing), the latest news, building regulations and links with organizations related to the department.

*Nova Scotia Department of Housing and Municipal Government* English
http://www.gov.ns.ca/homa

This site contains a considerable amount of information on the department, its activities and various regulations; special items on assessments, social housing, the geography of the region, municipal services, etc. Moreover, numerous publications can be consulted online along with photographs and maps of the region.

*British Columbia Ministry of Municipal Affairs and Housing* English
http://www.marh.gov.bc.ca

This site, which also has a search engine, contains a lot of information presented in temperate format on the department, online publications, building codes, etc. The site was being developed in July 1998.

*Union of British Columbia Municipalities (UBCM)* English
http://www.civicnet.gov.bc.ca

Civicnet is a source of information intended for British Columbia municipalities and accommodates their Web pages. Members have discussion lists and private news groups. They can also consult the various documentary resources and UBCM publications online. The site is visually appealing. Numerous links are indicated, and a search engine has been provided to research the pages of the site.

*Association of Ontario Municipalities* English
http://www.amo.on.ca

The site interface is sophisticated and very polished. Municipalities can access information on policies, legislation, etc., via a private Intranet. The Web site contains little information.

*U.S. Department of Housing and Urban Development (HUD)* English
http://www.hud.gov

This very extensive government site stands out due to its completeness and its tone of language. In addition to presenting recent information and numerous statistical data, useful information is indicated and generally presented concisely. For example, the section on community plans summarizes the status of urbanization in each city.

*United Nations Centre for Human Settlements, Habitat II —*
*World Assembly of Cities and Local Authorities, Istanbul, 1996* English
http://www.undp.org/un/habitat/

A prime example of an official site replete with statements made at conferences, plenary statements, documents of preparatory committees, etc. Unfortunately, numerous links with unofficial and non-government organizations participating in the program do not seem to be active any more. That shows how Internet information can be short lived.

*Organization for Economic Co-operation and Development (OECD) /*
*Organisation de coopération et de développement économiques (OCDE)* English/French
http://www.oecd.org

This catalogue-style site offers a multitude of statistical data and analytical reports for a fee.

## Construction and architecture

These sites are intended for builders, researchers working on new techniques or homeowners looking for advice on purchasing a home or renovations. Because there are just so many contractor Web sites, they do not all appear here. It is interesting to note that sites of firms in the construction or architecture field often have photographs of model homes and some are even available in several languages, for example, Japanese and German.

*Canadian Home Builders' Association (CHBA) /*
*Association canadienne des constructeurs l'habitations (ACCH)* English
http:/www.chba.ca/

This site describes the structure and activities of the CHBA. Some sections on the purchase of a home and renovation are offered to the general public. This site is very extensive and detailed, and constitutes a major source of information. It makes full use of the open and "voluble" nature of the Internet. The pages are concise and offer numerous hyperlinks, particularly with respect to the housing sector in Canada (numerous builders' associations have been identified). Moreover, the interface is very pleasant and easy to navigate.

*Association provinciale des constructeurs d'habitation du Québec (APCHQ)* French
http://www.apchq.com

Lovers of sophisticated Web sites with sounds and images will like the APCHQ site, which contains a section for the general public, a considerable amount of information for industry professionals and a Carrefour des membres (Members Meet) section which is private and accessible by password. Note that a search engine makes it easy to find details on builders, contractors or suppliers.

*Ontario New Home Warranty Program (ONHWP)* English
http://www.newhome.on.ca

This very complete site is intended for builders and consumers. A huge amount of information is presented in addition to details on the new home warranty program. The site contains a guide of builders and allows you to order publications. Hyperlinks to useful resources in the housing industry have also been indicated.

*National Association of Home Builders (NAHB)* English
http://www.nahb.com/pg2.html

This is a very complete site with a wealth of information and policy analyses on the housing sector in the United States.

*NAHB Research Centre Inc.* English
http:/www.nahbrc.org/

The NAHB has posted a list of publications offered along with a brief summary. This site allows users to ask for information on the publications which are not directly accessible via the site. A few technical explanations have also been presented.

*The Royal Architectural Institute of Canada /*
*L'Institut royal d'architecture du Canada* English
http://www.raic.org/

The site presents the Institute, its mission and its activities. Through this site, you can gain access to provincial associations and a multitude of others relating to the field of architecture internationally.

*Building Canada /*
*Édifices Canada* English/French
http://blackader.library.mcgill.ca/cac/bland/building/indexfr.html

This site, which deals with the history of Canadian architecture, is an ambitious and useful project. The pages contain a large number of photographs.

*Prairies Archnet* English
http://cad9.cablab.umanitoba.ca/archnet.html

This complete and prize-winning site presents architecture in the Prairies and enables you to navigate to a multitude of interdisciplinary sites across Canada and elsewhere in the world. It really exploits the potential of Internet with the use of visual effects and elements of virtual reality.

*AECInfo: Architecture, Engineering, Building Centre* English
http://www.aecinfo.com/

A commercial repertoire lists the sites linked to the field of architecture in addition to sites in the construction field.

*Planning and Architecture Internet Resource Center* English
http://www.arch/buffalo.edu/pairc/

This bibliography of Web sites concerning planning and architecture contains a detailed index and a search tool. It is the Yahoo! of planning and architecture. This site is updated by a graduate of the University of Buffalo.

*Green Building Information Council* English
http://greenbuilding.ca/index.html

This is a consortium of researchers and stakeholders interested in new construction practices. Numerous links have been proposed, particularly to data based on matters relating to the energy and the environment.

*Electronic Journal of Information Technology in Construction* English
http://itcon.org/

This journal deals with the integration of information in the construction sector on an academic level and is published by the Royal Institute of Technology of Stockholm, Sweden.

*Urban Development Institute* English
http://www.udi.bc.ca

This site presents a useful manual for condominium purchasers and contains a good set of external links. Publications and policy research, particularly in the area of assessments, can be consulted online. Information is clearly presented and navigation is easy.

*Building Web* English
http://www.buildingweb.com

This ambitious commercial site contains an impressive and continually expanding repertoire of data on professionals in the construction sector. It also provides information on products and services and technical data. A search engine is available on the site.

*Canadian Wood Council /*
*Conseil canadien du bois* English/French
http://www.cwc.metrics.com/

This site contains a lot of information intended for members of the Council and also for teachers, students, consumers and designers. Fact sheets and examples can be consulted directly on site.

*Canadian Residential Energy End-Use Data and Analysis Center (CREEDAC)* English
http://www.tuns.ca/~fung/creedac/creedac.html

The Centre's mission, objectives, structure and data on its main members appear on this site.

*Home Web*
http://www.magi.com/~homes/

Home Web is a commercial repertoire of real estate sales sites. Some contractors listed in the site also publish ads in Japanese and German.

*Québec Building Envelope Council (QBEC) /*
*Conseil de l'enveloppe du bâtiment du Québec (CEBQ)* English/French
http://www/aecinfo.com/qbec/index.html

Council activities are presented on the site along with a list of its publications, future events (such as conferences) and a few external links.

*Builder Online* English
http://www.builderonline.com

Hanley Wood Inc., a U.S. company specializing in publishing in the housing field, offers various information on its Web site—the latest news in the construction field, a catalogue of products, practical advice and a large bank of house plans which can be ordered directly.

## Real estate

Real estate firms have quickly caught on to the potential of the Internet, and Web sites in this sector are springing up constantly and becoming more developed. They are distinguished by their very large volume of documents, which are updated frequently, and by their increasingly sophisticated search techniques, which enable the eventual purchaser to select from a list of homes according to personal preferences. Similarly, many newspapers have begun running their classified ads on the Web while keeping their printed version.

*The Canadian Real Estate Association (CREA) /*
*Association canadienne de l'immeuble (ACI)* English/French
http://www.mls.ca/crea/welcome.htm

This site constitutes a very interesting gateway which makes it possible to access a database containing all the regional lists of houses for sale by the service inter-agences (SIA) online (or Multiple Listing Service—MLS Online). This database contains a photo of the house, its price, its neighbourhood (no address), the number of rooms, and a Web site or electronic mail address to contact an agent directly. Besides being an essential source of information (statistics, news) in the area, it contains hyperlinks with provincial and territorial associations.

*Association des courtiers et agents immobiliers du Québec (ACAIQ)* English/French
http://www.acaiq.com

The ACAIQ Web site provides information for its members such as the latest news, legal information, publications, forms, directory of members, and so on, and for the general public, advice on the purchaser or the seller, etc. (The English version of the site is under development).

*Real Estate Institute of Canada* English
http://www.reic.ca

This site provides, among other things, training programs offered by the Institute, information on professional accreditations and a useful search took to locate data concerning members. Members will have a forum at their disposal shortly.

*International Real Estate Digest* English
http://www.ired.com

This site contains an immense listing of all real estate firms in the world classified according to country, region and town. Numerous Web sites with various information on the real estate field also appear on this site. Through the use of an automated translation, this site can be consulted in six languages: English, French, Spanish, Italian, Portuguese and German. (The translation is often a rough approximation but is enough to enable the reader to understand what is meant.)

*National Association of Realtors* English
http://www.realtor.com

The official site of the national association of American realtors is a huge and very complete site intended for the general public and real estate agents. In addition to providing a large volume of information on the real estate field, it also allows access to a database, enabling users to seek properties in every U.S. state using geographical or real estate criteria such as neighbourhood, number of rooms, etc.

*Rent Canada* English
http://www.rentcanada.com

This guide consists of advertisements of apartments, condominiums or commercial properties for rent across Canada. Advertising is accepted on the site in return for a fee.

*The Montréal Real Estate Page /*
*La Page Immobilière de Montréal* English/French
http://www.firstcorp.ca/global/indexf.htm

The Montréal Real Estate Page offers information on what is for sale and for rent in the Greater Montréal area in the residential, industrial, commercial and real estate sectors. This Web site also contains a list of professionals and companies in this field.

*Le guide immobilier Web du Québec* — French
http://www.imobilis.com

This site is a list of Web sites related to the real estate field in Québec. It constitutes an Internet resource centre for individuals wishing to acquire property and for professionals in the field.

*Yahoo Real Estate Directory* — English
http://www.yahoo.com/business/real estate

Yahoo!, an Internet search engine, can yield numerous Web site addresses relating to the real estate field.

*Yahoo* — English
http://classifieds.yahoo.com/residential.html

Yahoo! also offers a site where users can obtain the price, number of rooms, etc., of a residential property in the United States by indicating a region or a city or town. You can even obtain a map of the neighbourhood and zoom in on a particular location.

*La Toile du Québec—Immobilier* — French
http://www.toile.qc.ca/quebec/qccom_im.htm

La Toile du Québec (the search engine for Québec Web sites) provides the addresses of interesting sites relating to the real estate field.

*NAREIT Online—The National Association of Real Estate Investment Trusts* — English
http://www.nareit.com

NAREIT Online offers a large amount of information concerning real estate investment trusts. Many documents are available on the site, which also presents statistical data and the latest news in the field. Some pages of the site are reserved for the exclusive use of members.

*NMHC Online—The National Multi-Housing Council* — English
http://www.nmhc.org

This site contains information on the multifamily rental housing market (condominiums, apartments, seniors' residences) in the United States, particularly with respect to legal matters. A special section on site is reserved for members.

## Financing and mortgage loans

Banks and financial institutions are very interested in the development of new electronic teller services over the Internet, a feature which is taking flight. At present, a few sites provide general information on mortgage rates, and some sites offer mortgage payment charts.

*Canadian Bankers Association /*
*Association des banquiers canadiens* English/French
http://www.cba.ca/

The Association's Web site presents information and statistics mainly on the Canadian banking system. This site is mainly intended for the general public and students. Printed forms, which are not available online, can be ordered.

*RFO Inc. Real Estate Financial Options* English
http://www. canvest.com/RFO/

This site provides consumers with simple information on mortgages. A loan approval process via the Internet is currently being developed. External links on the site make it possible to contact real estate agents in British Columbia.

*Mortgage Line Financial Services Inc.* English
http://www.mortgageline/bc.ca/pages/getting.html

This commercial site contains information on mortgage loans.

*Financial Institutions Commission* English
http://www.fic.gov.bc.ca/

This site offers a good description of financial services offered in British Columbia; however, there is no information on mortgage brokers.

*Mortgages Canada* English
http://www.mortgages-canada.com

This site shows current interest rates, and users can estimate a specific case using the chart provided.

*Credit Union Central of Ontario* English
http://www.cuco.on.ca

This site contains information on this particular financing system and a list of the various affiliated financing companies in Ontario.

*Appraisal Institute of Canada /*
*Institut canadien de evaluateurs* English/French
http://www.aicanada.org/

The Institute offers information to its members, the general public and students. A search tool makes it possible to obtain data on members of the Institute and appraisers internationally. Members have a discussion group on the site. (The French version of the Web site is currently being developed.)

*Alberta Association of the Appraisal Institute of Canada* English
http://cyberpage.com/appraisal/alberta/appraisal.html

This site provides a few links to firms in the field in Alberta, plus information on training programs or seminars and the Association's bulletin.

*British Columbia Association Appraisal Institute of Canada* English
http://cyberpage.com/appraisal/bcappraisal.html

Identical to previous site, this one provides information for British Columbia.

*Fannie Mae* English
http://www.fanniemae.com

The site of this American financial products and services firm provides useful information regarding mortgage financing. The information is intended for loan companies (financial information, products and services of the company, etc.) and for buyers (bank of Fannie Mae properties). Note that useful information is also available to those doing housing research (Fannie Mae Foundation). Some Web pages are provided in Spanish.

*Hugh's Mortgage and Financial Calculators* English
http://www.interest.com/hugh/calc/

This site contains a formula to help you calculate mortgage payments.

*World Bank /*
*Banque mondiale* English
http://www.worldbank.org/

This site contains technical documents and interesting analyses. A wealth of studies on the development of effective financial sectors is also available. Some studies deal with urban infrastructures and management-related issues. These studies focus on development.

## Planning and related specialties

Urban planners, surveyors and those in other planning-related fields generally have very complete Web sites at their disposal. Some are also intended for the general public. Geographical information systems (GIS) are still quite underdeveloped in Canada.

*Canadian Institute of Planners /*
*Institut canadien des urbanistes* English
http://www.cip-icu.ca/

This site provides a good description of the Institute's activities. It is essentially aimed at professionals, although it does contain a few examples of potential interest to the general public.

*Institute of Urban Studies (University of Winnipeg)* English
http://www.uwinnipeg.ca/~ius/title.htm

This site describes the Institute and makes its various publications accessible online.

*Faculté de l'aménagement (Université de Montréal)* French
http://www.ame.umontreal.ca

This Web site provides information on various course programs in architecture, urban planning or design.

*Association of Ontario Land Surveyors /*
*Association des géomètres de l'Ontario* English
http://www.interlog.com/~aols

All information pertaining to the land surveyors profession appears on this site. It also contains a list of firms in the field (public agencies and private firms). Publications are available online and classified advertising can even be submitted.

*The Corporation of Land Surveyors of the Province of British Columbia* English
http://www.islndnet.com/~bclsweb

This site provides a source of information essential to its members. This includes information on the exercise of the profession, a list of public and private companies, online publications, etc.

*American Planning Organization* English
http://www.planning.org/

This is a collection of articles from the monthly planning journal of this organization and the latest releases concerning policy statements.

*National Association of Housing and Redevelopment Officials* English
http://www.nahro.org/

This site contains a complete list of publications offered by this U.S. firm.

*Urban and Regional Information Systems Association* English
http://www.urisa.org/index.html

This site provides information on the latest developments in geographical information systems (GIS) and summaries of issue papers.

*Downtown* English
http://www.downtown.org/

This recent electronic magazine concerns the restoration of a downtown area. Sponsored by a downtown (area) in Missouri, this magazine does not want to be confined to local problems, but rather wants to become a site where information can be exchanged on the restoration of other downtown cores.

*International Institute for Sustainable Development* (based in Manitoba) English
http://www.iisd.ca/

This site is a wealth of information on the habitat, sustainable development, Action 21 and biodiversity.

## Cooperative housing

The cooperative housing field has its own Web sites, some of which exploit the potential of the Web as an electronic community.

*Co-operative Housing Federation of Canada /*
*Fédération de l'habitation coopérative du Canada* English/French
http://www.chfc.ca

The site provides relevant information on housing cooperatives, while at the same time addressing the general public. The Federation's mission and activities are clearly explained on the site, and links to cooperatives or related organizations are indicated.

*Windsong Cohousing Community* English
http://www.cdnl.com/windsong/

The site of this housing cooperative provides interesting information on the subject of cooperative housing.

*Intentional Community* English
http://www.well.com/user/cmty/index.html

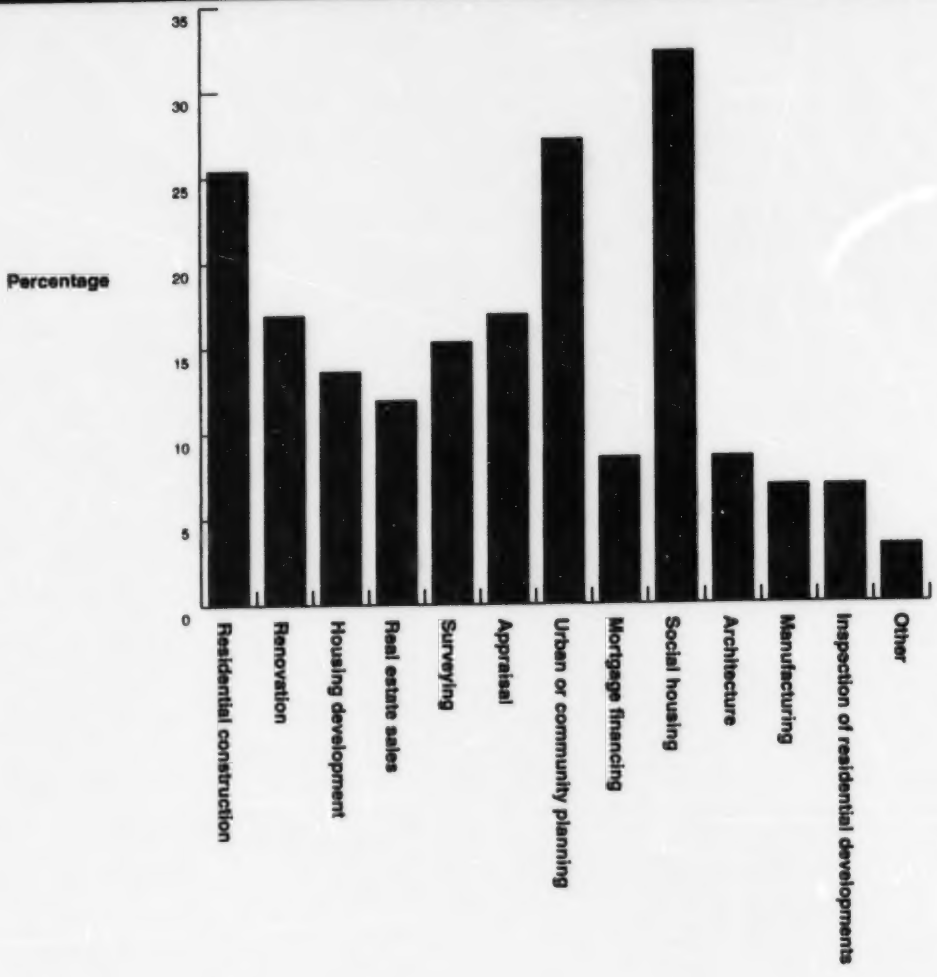
This site provides numerous links to Web sites, discussion lists, forums, and so on concerning the cooperative housing field.

# *Appendix B*

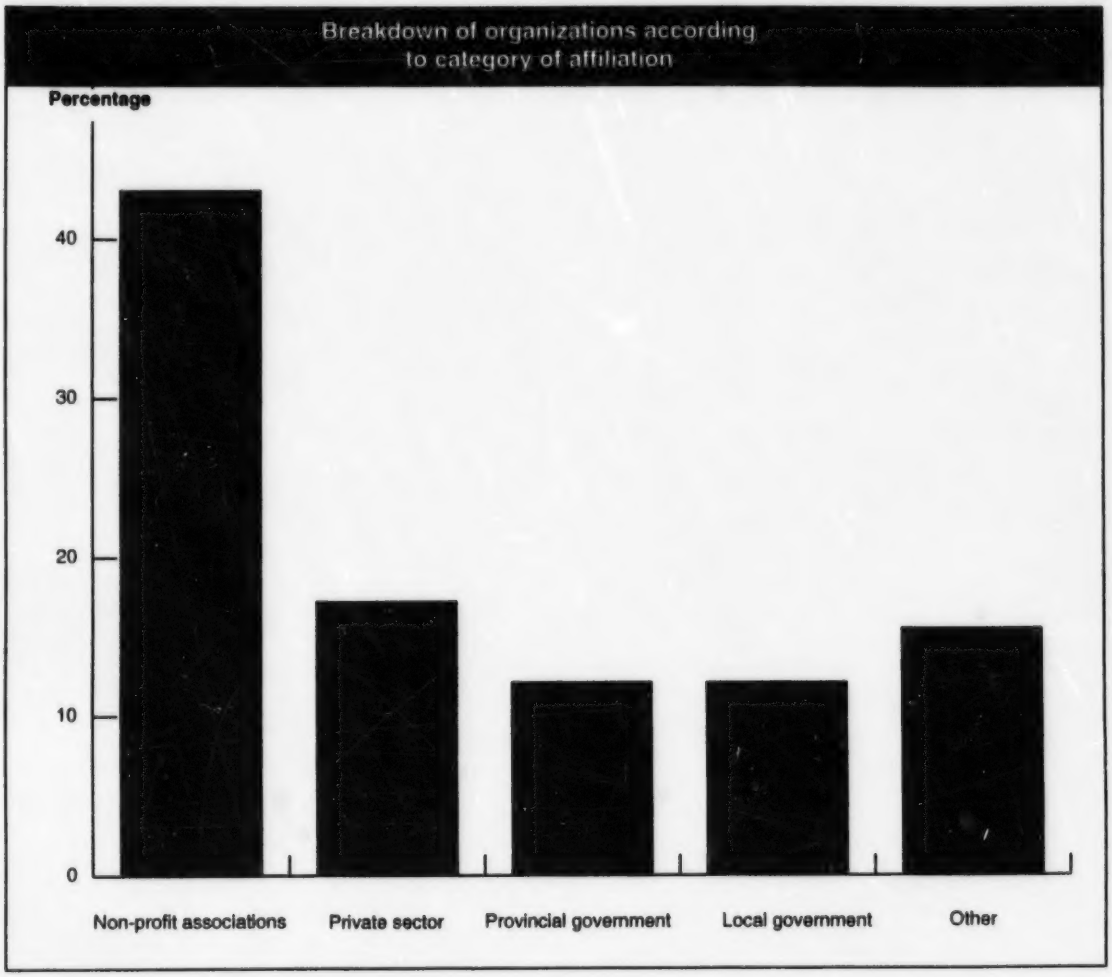
# *Survey methodology*

## Characteristics of the sample of respondents

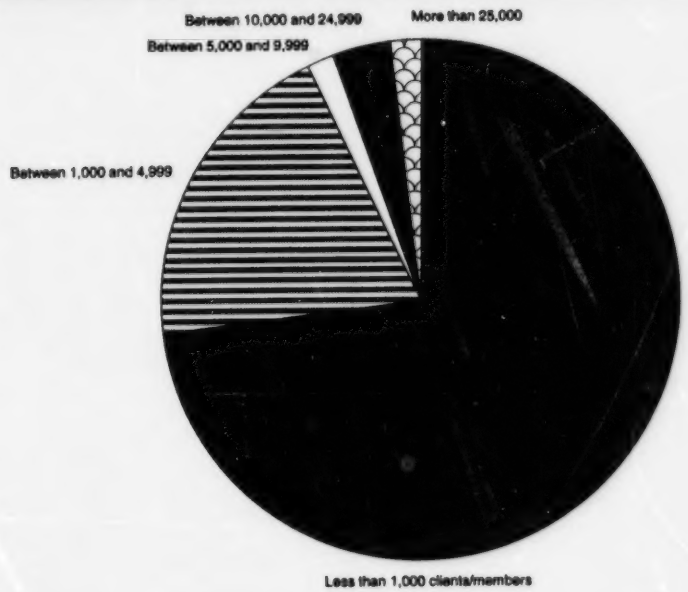
Breakdown of organizations according to area of activity*



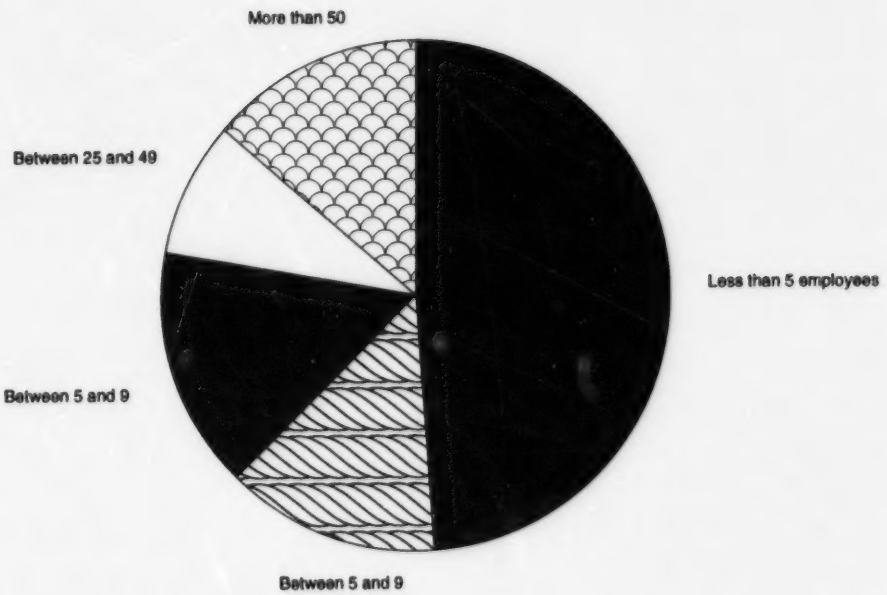

* The figures presented are cumulative estimates, as some organizations belong to several areas of activity.


Breakdown of organizations according to category of affiliation
Percentage
40
30
20
10
0
Non-profit associations
Private sector
Provincial government
Local government
Other

## Number of clients/members of organizations




## Number of employees in organizations



## Representativeness of survey

Questionnaires in English and French were sent out to about 150 associations in the housing sector surveyed by CMHC. Roughly 60 responded, representing a response rate of about 40 per cent.

Note that associations already connected to the Internet may have been more inclined to participate in the survey than others which were not. This possibility could then influence the results.

## Confidentiality of data

The results of the survey were reported collectively to guarantee the confidentiality of the information gathered. No individual responses were identified.

## Statistical treatment

Frequency analyses and data crossing (the chi square test) were performed. In general, data crossing provided few significant results, essentially due to the small sample size: n = 59.

# The Future of the Internet and the Housing Sector—Organization Survey

How is the Internet used in Canadian housing and community planning? How is the Internet likely to evolve within the housing sector in the next few years? These are some of the questions that the Centre for Future Studies at Canada Mortgage and Housing Corporation (CMHC) is seeking to explore in its study on The Future of the Internet and the Housing Sector.

The attached questionnaire is being sent to housing-related associations across Canada. This survey seeks to identify where you think your organization will most successfully apply the Internet in the next few years. Questions are also asked on your current use of computers and the Internet and your readiness to embrace this new technology.

**Your input is critical to the success of the study**. Please have the questionnaire completed by the person in your organization who is most familiar with your current and planned future use of the Internet.

We would appreciate you completing the questionnaire and **returning it by March 14, 1997**. You may also answer the survey on-line at http://www.syllable.com/housing. If you wish your answers to remain confidential, simply indicate it at the end of the questionnaire.

Completing the questionnaire should take no more than 25 minutes. If you require any help in filling out the questionnaire, please do not hesitate to contact Benoit Sanscartier at (613) 748-2090 or BSANSCAR@CMHC.E-MAIL.COM. We have provided a postage-paid, pre-addressed envelope for your convenience to be mailed back to us by March 14, 1997.

**Your help is vital in this endeavor**. Thank you in advance for your co-operation.

Denys Chamberland
Manager,
Centre for Future Studies in
Housing and Living Environments

## SECTION 1.0 Internet access

To start we would like to ask you a few questions about your organization and its access to the Internet.

Q1.1 Do employees in your organization have access to the Internet?

- ❑ Yes ==> E-MAIL ❑, World Wide Web ❑
- ❑ No (please go to Q1.3)

Q1.2 For how long has your organization had access to the Internet? **(after please go to question Q1.4)**

- ❑ Less than six months
- ❑ 6-11 months
- ❑ 1-2 years
- ❑ 3- 5 years
- ❑ 6 years and more

Q1.3 When do you expect your organization will have an Internet connection? **(after please go to Section 2.0)**

- ❑ within the next six months
- ❑ 6-11 months
- ❑ 1-2 years
- ❑ Do not know
- ❑ Never

Q1.4 What percentage of your staff has access to the Internet at work?

- ❑ Less than 25%
- ❑ Between 25% and 49%
- ❑ Between 50% and 74%
- ❑ Between 75% and 100%

Q1.5 What do you and your staff access on the Internet? (Check all that apply)

- ❑ E-mail amongst colleagues
- ❑ E-mail from members
- ❑ E-mail from discussion groups or newsletters
- ❑ Web sites with government data
- ❑ Web sites with information about suppliers
- ❑ Web sites with market research
- ❑ Web sites with international information
- ❑ Other **(Please specify)**: _____

## SECTION 2.0 Internet usage - web site

Now we would like to ask you what use you make of the Internet.

Q2.1 Do you have a web site?

- ❑ Yes - for how many months? _____
- ❑ Your URL is http://_____ **(please go to Q2.3)**
- ❑ NO

Q2.2 You plan to have a web site:

- ❑ Within one year
- ❑ in More than one year
- ❑ Never **(please go to Q2.4)**
- ❑ Don't know **(please go to Section 3.0)**

Q2.3 What are the most important reasons why your organization has, or plans to have, a web site? **(please check all that apply and go to Q2.5)**

- ❑ To keep up with the competition
- ❑ To provide product and service information
- ❑ To take orders for products or services
- ❑ To collect information from potential clients
- ❑ to deal with partners
- ❑ To gain experience with the Internet
- ❑ Other **(please specify):** _____

Q2.4 What are the most important reasons explaining why your organization does not intend to have a Web site? **(please check all that apply and go to Section 3.0)**

- ❑ TOO EXPENSIVE
- ❑ THE BENEFITS HAVE NOT BEEN PROVED
- ❑ DO NOT HAVE THE EQUIPMENT
- ❑ NOT USEFUL
- ❑ DO NOT SEE THE POTENTIAL
- ❑ TOO FEW MEMBERS HAVE EXPRESSED THE NEED
- ❑ OTHER **(please specify):** _____

Q2.5 Do you monitor the number of hits/visits at your web site?

- ❑ Yes How many per month? _____
- ❑ No **(please go to Q2.7)**
- ❑ Don't know **(please go to Q2.7)**

Q2.6 You use the number of hits/visits to: **(check all that apply)**

- ❑ Revise the site,
- ❑ to determine the popularity of specific pages
- ❑ Don't use the information
- ❑ Other **(please specify):** _____

Q2.7 How much time is spent updating your web site?

_____ hours each week ❑ or EACH month ❑

Q2.8 Who updates your web site?

- ❑ Secretarial staff
- ❑ Computing staff
- ❑ Outside consultant
- ❑ Other **(please specify):** _____

## SECTION 3.0 Internet perception

In this section we would like to ask you to identify your association's perception of the Internet and whether you have surveyed your members.

Q3.1 Have you collected, formally or informally, data on how and to what extent your clients and /or members use the Internet?

- ❑ Yes. (If this information could be made available to CMHC and colleagues in the housing sector, please enclose a copy with this questionnaire.)
- ❑ No

Q3.2 What does your association perceive as major hurdles to using the Internet more?

- ❑ Lack of computer equipment
- ❑ Lacl. of skills
- ❑ Lack of security
- ❑ OTHER **(please specify):** _____

Please explain: _____

_____

_____

Q3.3 What does your association perceive as major motivations to using the Internet more?

- ❑ Need for up-to-date information
- ❑ Cheaper than phone, courier, and magazine subscriptions
- ❑ easier /quicker than other method to access information
- ❑ OTHER **(please specify):** _____

Please explain:

_____

_____

_____

Q3.4 Does your organization offer your staff training in the use of the Internet?

- ❑ Yes
- ❑ Not yet, but plan to do so
- ❑ Not planned

Q3.5 Intranet: Do you use an Intranet (a private web site - that can be accessed solely by employees or board members)?

- ❑ Yes
- ❑ Not yet, but plan to do so
- ❑ Not planned **(please go to Section 4.0)**

Q3.6 Intranet: Do you now, or do you plan to, use your in-house Intranet to:

- ❑ publish business plans and objectives for employees
- ❑ publish internal policies and procedures for
- ❑ employees (such as human resources or travel policy information)
- ❑ publish useful links to outside sites for use of employees
- ❑ encourage work groups or individual employees to publish on
- ❑ the Intranet for employees
- ❑ other **(please specify):** _____

## SECTION 4.0 Computers in the workplace

In this section we would like to know the level and extent of the use of computers in your organization. This information will enable us to measure the degree to which your organization will make use of the Internet's potential.

Q4.1 Proportion of your staff with access to the following computing facilities at work? (check all that apply)

| None | Some | Many | |
|---|---|---|---|
| ❑ | ❑ | ❑ | Computer |
| ❑ | ❑ | ❑ | internal computer Network for file sharing (LAN or WAN) |
| ❑ | ❑ | ❑ | Connection to Internet |
| ❑ | ❑ | ❑ | Modem |
| ❑ | ❑ | ❑ | Monitor with graphics capabilities |
| ❑ | ❑ | ❑ | CD-ROM |
| ❑ | ❑ | ❑ | Sound |
| ❑ | ❑ | ❑ | Digital camera |

Q4.2 How many days a year of training in the use of computers on average does each of your staff receive?

- ❑ Less than 5 days
- ❑ Between 5 and 10 days
- ❑ More than 10 days
- ❑ They self-train
- ❑ Don't know

Q4.3 Do any of your staff use computers in the workplace for: (check all that apply)

| None | Some | Many | |
|---|---|---|---|
| ❑ | ❑ | ❑ | Word processing |
| ❑ | ❑ | ❑ | Desktop publishing |
| ❑ | ❑ | ❑ | Architectural/engineering drafting |
| ❑ | ❑ | ❑ | Geographic information systems |
| ❑ | ❑ | ❑ | Graphic design |
| ❑ | ❑ | ❑ | 3-D modeling |
| ❑ | ❑ | ❑ | Accounting and budgeting |
| ❑ | ❑ | ❑ | statistics (spreadsheets, statistical packages) |
| ❑ | ❑ | ❑ | Simple databases (mailing lists, membership lists) |
| ❑ | ❑ | ❑ | Complex databases (library systems, project scheduling) |
| ❑ | ❑ | ❑ | Other **(please specify)** :_____ |

## Section 5.0 Collaboration activities

This section seeks to identify how important the need for collaboration is in your business.

Q5.1 How does a typical committee or work group communicate in your organization? (check all that apply)

- ❑ Phone
- ❑ E-mail or courier
- ❑ Fax
- ❑ Teleconferences
- ❑ Face-to-face meetings locally
- ❑ Face-to-face meetings involving inter-city travel
- ❑ Other **(please specify):**_____

Q5.2 How do you typically communicate with outsiders such as suppliers, customers, or members? (check all that apply)

- ❑ Phone
- ❑ E-mail
- ❑ Mail or courier
- ❑ Fax
- ❑ Teleconferences

- ❑ Face-to-face meetings locally
- ❑ Face-to-face meetings involving inter-city travel
- ❑ Other **(please specify):** _____

## SECTION 6.0 Publishing (advertisements, information sheets, newsletters, magazines, etc.)

This section seeks to identify the nature of the publishing activity in your organization.

Q6.1 Publishing is a significant part of your organization's activity:

- ❑ Not at all (please go to Section 7.0)
- ❑ Somewhat
- ❑ Very much

Q6.2 Which of the following documents would you typically publish? (check all that apply)

| Never | Sometimes | Frequently | |
|---|---|---|---|
| ❑ | ❑ | ❑ | Press release |
| ❑ | ❑ | ❑ | Product information |
| ❑ | ❑ | ❑ | Annual report or quarterly report |
| ❑ | ❑ | ❑ | Statistics |
| ❑ | ❑ | ❑ | Research document |
| ❑ | ❑ | ❑ | Application form |
| ❑ | ❑ | ❑ | Advertisement |
| ❑ | ❑ | ❑ | MAGAZINE |
| ❑ | ❑ | ❑ | Other **(please specify):** _____ |

Q6.3 Of the documents you have published, do you typically:

- ❑ Give them away for free
- ❑ Set a fee to recover costs on published material
- ❑ Aim to make a profit on published material
- ❑ Other **(please specify):** _____

## SECTION 7.0 Research or product development

This section highlights information about the sort of research that is done by your organization in order to appreciate how relevant the Internet could be for this activity.

Q7.1 Research or product development is a significant part of your organization's activity:

- ❑ Not at all **(please go to Section 8.0)**
- ❑ Somewhat
- ❑ Very much

Q7.2 To do research, you need to access: (check all that apply)

| Never | Sometimes | Frequently | |
|---|---|---|---|
| ❑ | ❑ | ❑ | Statistics |
| ❑ | ❑ | ❑ | Policy documents or reports |
| ❑ | ❑ | ❑ | Recent publications |
| ❑ | ❑ | ❑ | Original historical publication |
| ❑ | ❑ | ❑ | Surveys of customers or members |
| ❑ | ❑ | ❑ | In-house libraries |
| ❑ | ❑ | ❑ | Public and university libraries |
| ❑ | ❑ | ❑ | periodical indexes and abstracts |
| ❑ | ❑ | ❑ | Other **(please specify):**_____ |

Q7.3 Your research relies on: (check all that apply)

- ❑ integrating statistical data
- ❑ integrating visual information
- ❑ achieving consensus amongst a disparate group of individuals or organizations
- ❑ other **(please specify):** _____

## SECTION 8.0 Your ideas

In this section we would like to invite your organization to comment on different aspects of the Internet potential.

Q8.1 What type(s) of information/business application would your organization most like to see added to the Internet?

_____

_____

_____

_____

_____

Q8.2 For organizations with a web site: Does your organization have a success story to share that demonstrates the effectiveness of your web site, such as identifying a new market or improving customer service?

Q8.3 For organizations with a web site: Did your organization have expectations that were not fulfilled by the web site?

Q8.4 Are you aware of some positive or negative experience your members had or have with the Internet?

Q8.5 Do you expect the Internet to fundamentally change the way your organization does business in the next 10 years?

Q8.6 Do you expect the Internet to change the way your members or partners do business in the next 10 years ?

## SECTION 9.0 About your organization

Q9.1 The name of your or organization is:

Q9.2 Please describe the area of the housing sector your organization is most involved in:

- ❑ Home Building
- ❑ Renovation
- ❑ Real Estate Development
- ❑ Real Estate Sales
- ❑ Surveying
- ❑ Appraisal
- ❑ Urban or Community Planning
- ❑ Home Financing
- ❑ Social Housing
- ❑ Architecture
- ❑ Manufacturing
- ❑ home Inspection
- ❑ Other **(please specify):**

Q9.3 Does your organization promote its industry or sector outside Canada?

- ❑ Yes
- ❑ No
- ❑ Don't know

Q9.4 Your organization represents:

- ❑ Private sector
- ❑ FEDERAL GOVERNMENT
- ❑ Provincial government
- ❑ Local government
- ❑ Non-profit association
- ❑ Other **(please specify):**

Q9.5 Your organization has a membership of :

- ❑ LESS THAN 1,000
- ❑ 1,000 TO 4,999
- ❑ 5,000 TO 9,999
- ❑ 10,000 TO 24,999
- ❑ 25,000 AND OVER

Q9.6 Your organization has:

- ❑ Less than 5 employees
- ❑ 5 to 10 employees
- ❑ 10 to 25 employees
- ❑ 25 to 50 employees
- ❑ More than 50 employees

Q9.7 It is possible that the information relative to your experience with the Internet gathered in this questionnaire could be useful for other organizations in the housing sector. Consequently, we would like to know your reactions to the possible use of your replies in the final report.

- ❑ must stay confidential
- ❑ could be published without my consent
- ❑ want to be consulted before any of my replies are used
- ❑ no preferences
- ❑ other **(please specify):**_____

Q9.8 In closing would it be possible to have your name, telephone number and/or E-Mail address ?

Name : _____

Position : _____

Tel #. _____ E-Mail : _____

**You have completed the questionnaire.**

**Please place it in the postage-paid envelope and send it back to us by March 14, 1997.**

**Thank you very much for your co-operation.**

# *APPENDIX C*

# *RESULTS OF STRATEGY-BUILDING SESSIONS*

## Environment challenges in the housing sector

A common theme among participants was that they were dealing with an extraordinary pace of change in their work environment.

### Vis-à-vis their markets

#### *Full service*

There is pressure to provide a more complete service to users, the full-service model. More targeted market research provides a better profile of clients, which in turn drives the need to revamp an organization's product or service delivery. Organizations, regardless of whether they are private, public or quasi-public sector are fighting to keep their clients, whether tenants, builders or researchers.

#### *Import/export challenges*

Growing export opportunities for Canadian technology raise two important needs: to do market research on foreign building techniques and on foreign paradigms for community development, and to publicize Canadian expertise and capabilities abroad. Similarly, international trade agreements and the growing use of electronic bidding systems increase the need to compete with foreign suppliers in traditional local markets.

#### *Greater speed*

Some participants working in growth markets, referred to the highly competitive character of their business, such as service to the mortgage industry. This imposes the requirement of quicker turnaround to customers who may otherwise go elsewhere. Clients demand instant gratification. The speed of the technology (sending an e-mail with a click of a button) has raised the expectation of a similarly speedy reply—placing unprecedented demands on staff.

#### *Communications challenges*

On the other hand, some participants reported difficulties reaching their customers. Some client groups have a lack of reading skills or interest in reading. Others deal with remote communities that have not developed a tradition of communicating by phone and fax, let alone e-mail and the Web. Still other report that while the seniors and the youth take the time to learn new technologies, busy, middle-aged consumers are reluctant to add one more tool, such as e-mail, to their current ways of communication.

### Within their organizations

#### *Changing staff structure*

Many groups, particularly public or not-for-profit sectors, are undergoing constant reorganization, with fairly dramatic changes to functional units. In some cases, libraries are completely closing down and computing staff being laid off, with a view to outsourcing these requirements. In other cases, the traditional role of the information systems staff is being supplanted by technology-enthusiastic marketing or communications staff, or data owners and providers such as planning or geographic information staff. Some participants referred to a growing trend toward flex-time, and telework where the employee does not regularly come into the office, or may not even have an office.

#### *Cost reduction and cost recovery*

In some environments, there is pressure to severely curtail, or even eliminate certain budget items. Staff are "maxed-out." This is often coupled with an institutional mandate to recover costs from users who traditionally have not paid for the services they receive, so there is a need to better identify what users will pay for.

#### *Greater efficiencies*

Even where there is no pressure to reduce budgets, there is extraordinary pressure to improve efficiencies, either in response to increased

business or to change in business requirements. In some cases, this might mean making meetings more productive. Participants would only travel to meetings, once "for information" or "reading" items are handled in advance through written, faxed and telephone communication. In other cases, this might mean increasing bargaining clout, by forming purchasing alliances. Another option for obtaining efficiencies may be automating work flow, to eliminate the exchange of paper forms for internal and external transactions.

***Decentralization***

The growing decentralized character of some organizations (either through the transformation of an existing organization, or through the creation of consortia to deliver a certain product) creates two challenges: how to share information effectively, and how to balance the work load better among regional offices. This is influenced by the different, possibly incompatible, technologies used in each location, and by the different work cultures in each location.

***Technology infrastructure***

The technology infrastructure is changing rapidly. In some sectors, there is a push to lease environments (where new computers are leased from vendors rather than purchased outright), with the goal of placing a computer with new technology on every staff member's desk. In the building and real estate community, on the other hand, there are many users on the road, or on the worksite, who see no need for computers, let alone Internet access. The increasing use of sophisticated computers within organizations raises unprecedented challenges for internal information technology (IT) staff. In many cases, they use the network of experts and other applications on the Internet to solve technical problems that earlier would have been dependent on the IT vendor (and a corresponding cost and delay) to solve technical problems.

***Benchmarking and standards***

There is growing use of benchmarks to measure performance against counterparts in the industry, so that there can be more creative solutions to business problems. At the same time, there is a need to find a way to customize national standards to local situations, to deal with the huge disparity in local housing market conditions.

***Training challenges***

Some areas of the housing sector reported significant hurdles to overcome in the lack of resources in the training area, not necessarily in information technology, but in building techniques and safety issues.